Neuralgia and kindred diseases of the nervous system : their nature, causes, and treatment : also, a series of cases, preceded by an analytical exposition of them, exemplifying the principles and practice of neuro-dynamic medicine / by John Chapman.

Contributors

Chapman, John, 1822-1894.
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Publication/Creation

London : Churchill, 1873.

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NEURO-DYNAMIC
MEDICINE

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NEURO-DYNAMIC MEDICINE,

PART VII:

NEURALGIA.

"The processes of the healing art are even now mostly empirical: their efficacy is concluded, in each instance, from a special and most precarious experimental generalisation: but as science advances in discovering the simple laws of chemistry and physiology, progress is made in ascertaining the intermediate links in the series of phenomena, and the more general laws on which they depend; and thus, while the old processes are either exploded, or their efficacy, in so far as real, explained, improved processes, founded on the knowledge of proximate causes, are continually suggested and brought into use. . . . .

"Among subjects really accessible to our faculties, those which still remain in a state of dimness and uncertainty (the succession of their phenomena not having yet been brought under fixed and recognisable laws) are mostly those of a very complex character, in which many agents are at work together, and their effects in a constant state of blending and intermixture. The disentangling of these crossing threads is a task attended with difficulties which, as we have already shown, are susceptible of solution by the instrument of deduction alone. Deduction is the great scientific work of the present and of future ages. The portion henceforth reserved for specific experience in the achievements of science is mainly that of suggesting hints to be followed up by the deductive inquirer, and of confirming or checking his conclusions."—J. S. Mill, *System of Logic*, second edition, Vol. I., Chap. xiii.

"Every generalisation is at first an hypothesis. In seeking out the law of any class of phenomena, it is needful to make assumptions respecting it, and then to gather evidence to prove the truth or untruth of the assumptions. The most rigorous adherent of the inductive method cannot dispense with such assumptions, seeing that without them he can neither know what facts to look for, nor how to interrogate such facts as he may have."—Herbert Spencer, *The Principles of Psychology*, page 344.

"Pour réussir dans l'investigation physiologique, il ne suffira pas, comme dans des sciences plus avancées, d'avoir seulement en vue de vérifier le résultat que la théorie indique, mais il faudra en même temps avoir l'esprit et les yeux attentifs à tous les phénomènes qui pourront naître intercurremment, qu'ils soient en faveur de la théorie ou contre elle."—Claude Bernard, *Leçons de Physiologie expérimentale appliquée à la Médecine*, tome 1er, p. 16.

NEURALGIA

AND KINDRED

DISEASES OF THE NERVOUS SYSTEM:

THEIR NATURE, CAUSES, AND TREATMENT.

ALSO

A SERIES OF CASES,

PRECEDED BY AN ANALYTICAL EXPOSITION OF THEM,

EXEMPLIFYING

THE PRINCIPLES AND PRACTICE

OF

NEURO-DYNAMIC MEDICINE.

BY

JOHN CHAPMAN, M.D., M.R.C.P., M.R.C.S.,

ASSISTANT-PHYSICIAN TO THE METROPOLITAN FREE HOSPITAL, AND
PHYSICIAN TO THE FARRINGDON DISPENSARY.

LONDON:

J. & A. CHURCHILL, NEW BURLINGTON STREET.

1873.

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GREAT WINDMILL STREET, W.

TO THE

RIGHT HONOURABLE EDWARD HENRY STANLEY,

EARL OF DERBY, P.C., D.C.L.,

WHOSE

WISE STATESMANSHIP, ENLIGHTENED PHILANTHROPY, AND GENUINE WELCOME OF EVERY DEVELOPMENT OF SCIENCE TENDING TO LESSEN THE SUFFERINGS AND TO INCREASE THE HEALTH OF THE PEOPLE ARE ALIKE NATIONALLY RECOGNISED,

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IN

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IN THE WIDE, AND STILL TO A GREAT EXTENT UNEXPLORED, FIELD OF

SCIENTIFIC MEDICINE.

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PREFACE.

THE main objects of this work may be stated as follows :—

(1.) To expound a doctrine explanatory of the nature, genesis, and causes of pain in general.

(2.) To exemplify the applicability of that doctrine as a means of explanation of the genesis and causes of neuralgia in particular.

(3.) To prove that neuralgia of that kind which is regarded as a special disease, and which has been distinctively designated "immaterial," "centripetal," and "true," cannot be scientifically differentiated from other kinds of pain, and that it and all other kinds of pain are, in respect to the nature of their proximate cause, essentially identical.

(4.) To give a series of explanations of the nature of those morbid changes in the nervous system constituting the groundwork and causes of all those collateral phenomena commonly called "complications" of neuralgia—explanations thoroughly accordant with each other, and with the doctrine just mentioned concerning the nature and causes of pain in general.

(5.) To show that the doctrines in question concerning pain in general, and neuralgia in particular, as well as the collateral phenomena of neuralgia, suggest a therapeutical principle, by the guidance of which the most successful method of counteracting each and all of those morbid states may be attained.

(6.) To prove implicitly by the whole body of facts and arguments adduced for the objects already mentioned, that in man, and indeed in all animals having a highly differentiated nervous system, the presence of disorder or disease, even in any part of the body other than that of the nervous system itself, is as a general rule—liable, however, to exceptions perhaps not yet

ascertainable—a phenomenon or expression and consequence of the existence of disorder or disease in some part of that system, and that that principle of healing is alone truly rational or scientific which, in order to remove morbid phenomena in any part of the organism, prescribes a method of treatment capable of operating as directly as possible on the nervous centres themselves, and thus of uprooting and removing from any part of them the immediate cause of those phenomena.

(7.) To exhibit an experimental verification of the pathological, etiological, and therapeutical principles which the work expounds —a verification consisting of 100 accurately reported cases (in each of which pain or sensory disorder was a prominent feature), proving that not only pain, but diseases of various kinds, and located in any part of the bodily periphery, can be most surely and most effectually remedied through the agency of the nervous centres themselves by a modification of their vital activity, and that this modification can be easily and comfortably produced, without the aid of drugs, by the practical application of the doctrines and method which collectively I have found it expedient to designate Neuro-Dynamic Medicine.*

The question whether in the following pages the objects just described are really accomplished remains for decision by competent Professional judges. I may observe, however, meanwhile, that if I did not feel confident that those objects were accomplished, this work would not have been printed. Moreover, bearing in mind how slowly, as a rule, new principles and practices of any kind are recognised and adopted, I am disposed to regard the progress already made in diffusing a knowledge of the principles and practice of Neuro-Dynamic Medicine as very encouraging and corrobative evidence of both the truth of the one and the efficacy of the other. It is scarcely ten years since the first crude exposition of them was published ;† in 1863 the first book on the subject was issued. That book was a monograph on the Functional

* For an explanation of the meaning intended to be conveyed by this term see p. 283, *et seq.*

† It appeared in the *Medical Times and Gazette*, July 18, 1863, and was entitled, "A New Method of treating Disease by Controlling the Circulation of the Blood in different parts of the Body.

Diseases of Women,* showing that those diseases originate in the nervous system, and are wonderfully controllable by the Neuro-dynamic method of treatment. The whole edition of the work was soon called for, and the book has now remained several years out of print, because, desirous of testing and showing the applicability of that method in other departments of disease, I have not had time to prepare a new edition. In 1864 appeared the first edition of the work on "Sea-sickness,"† which explained the genesis of the disease, proved it to be a disorder of the nervous system, and, by the reports of a series of experiments, also proved that that terrible malady is preventible and curable by the Neuro-dynamic method. In about three years the whole edition of that work was disposed of, and a second, enlarged, edition, containing reports of many additional experiments, which was published in 1868, is already nearly exhausted. The first edition of the work on "Diarrhœa and Cholera," showing that the proximate cause of those diseases is seated in the nervous system, and that they too are in a pre-eminent degree curable by the Neuro-dynamic method, was issued in 1865, and was reprinted in the United States. The demand for the whole of the English edition within a year induced me to publish the full and elaborate exposition of my views concerning the pathology, etiology, and treatment of Diarrhœa and Cholera, which appeared in 1866. Moreover, I have been informed by the publishers of the *Medical Press and Circular* that the papers on Epilepsy and Paralysis, in which I showed how successfully those diseases may be treated by the Neuro-dynamic method, caused the numbers of that Journal, in which they appeared, to go quite out of print. I apprehend that a large proportion of these books and papers were bought by members of the medical profession—a fact constituting, as I venture to think, indubitable evidence that an interest in the *principles*, at all events, of Neuro-dynamic Medicine has already been awakened in a considerable number of medical men; and

* "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." London: 1863.

† "Sea-sickness: its Nature and Treatment." London: 1864.

that many of them have already adopted the *practice* which those principles dictate is decisively attested by the continuous sale of the apparatus by means of which those principles are applied. I may add that I often receive letters from my professional brethren expressing their appreciation of the truth of the principles in question, and assuring me of their experience of the great remedial power derivable from their application. Considering these facts, I am justified, I think, in saying that the amount of practical recognition already accorded by the profession to the principles and practice of the system of medicine in question constitutes "encouraging and corroborative evidence of both the truth of the one and the efficacy of the other."

But however satisfactorily assured I may be that the main objects of this work are substantially achieved, I confess to feeling painfully sensible of the unsatisfactory character of the form and method of its execution. Its defects in these respects are partly due to the fact that several chapters of it, after being hastily written as contributions to a medical journal, were directly reprinted from the type of that journal, instead of being first carefully revised, or rather re-written, as they ought to have been. Then Chapter II., consisting of a slight critical sketch of Pathological Theories of Neuralgia, not only ought to have been much more thorough than it is, but it ought to have comprised the discussion of Dr. C. B. Radcliffe's "Theory of the Genesis of Pain," and of Dr. Anstie's "Pathology and Etiology of Neuralgia," constituting respectively Chapters VIII. and XI. For the reason assigned at the end of Chapter II., I resolved in the first instance to forego any discussion of the notable theories of these physicians: why, on reconsideration, it afterwards seemed to me expedient to examine the ground-work of fact and argument on which each of those theories is built I have explained at the beginning of the chapters devoted to them. And here I beg to tender a word of apology to the authors of those theories if, in the heat of discussion, I have made use of any expressions capable of giving pain or offence. The personal respect which I feel for both of them would make it impossible for me wilfully or consciously to do anything of the kind, and I hope, therefore, if I have said anything exceeding the limits of fair debate (and I am not aware

that I have) it will be ascribed to its only true cause—the warmth excited by the discussion of topics in which I feel an especially lively interest.

In respect to the issue of the discussion itself I await the verdict of the Profession with that patience and confidence which, of course, a believer in his own doctrine generally experiences. Meanwhile, should Dr. Anstie adduce any fresh facts or arguments for the purpose of replacing the seeming foundation which, I believe, I have removed from his hypothetical super-structure, or in order to counteract my criticism of it, I shall examine them quite as carefully as I have already examined those presented in his elaborate work—"Neuralgia and the Diseases which Resemble it." My remarks on Dr. Blande Radcliffe's theory of the genesis of pain were first published in the *Medical Times and Gazette*, and elicited from him a reply in a subsequent number of the same journal, viz., that of February 10th, 1872. That reply, which, substantially, is a mere re-statement of his own doctrine and of his reasons for it, leaves my arguments in disproof of it absolutely unanswered and almost wholly untouched. If those arguments are valid, my labour in endeavouring to point out in what respects the theory of Dr. Radcliffe, as well as that of Dr. Anstie, is inconsistent with a large array of ascertained pathological facts will contribute, I hope, not only to remove what might otherwise be regarded as strong *primâ facie* objections to the doctrines advocated in the present work, but also, by implication, to expose the fallacy of a pathological and therapeutical dogma which, ably advocated by Dr. T. K. Chambers,* has been especially fostered by Drs. Handfield Jones, Radcliffe, and Anstie, viz., that disease in general consists in a diminution of vitality, and that its treatment should mainly consist in the use of "aids to formative nutrition."

As already stated, the early chapters of this work were written some years ago; but the one on the "Pathology of Neuralgia and its Complications," which may be said to contain the "pith and marrow" of it, was re-written during the present year; for

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* See "Lectures, chiefly Clinical," by T. K. Chambers, M.D. Fourth edition. London: 1865.

I found that, though my views had not changed since the chapter was originally written and printed, they might be expressed and illustrated much more effectually than they were in the first instance. The new chapter exceeds considerably the limits of the one which it has replaced, and hence the pages of the sheet following page 48 are denoted by the letters of the alphabet.

Within the limits to which the chapter is now expanded I have explained as clearly as I can what I believe to be the true pathology of neuralgia, as well as of its most frequently observed collateral phenomena; but, indeed, the ground-work of that pathology, comprising as it does the fundamental elements or proximate causes of disease in general, is so extensive, and a preliminary exposition of that ground-work is so necessary to the correct understanding of the explanation offered, that a volume rather than a chapter is needed for the development of this subject alone; and here I cannot hope to have done it justice. I trust, however, that the views which I have attempted to develop are expounded with sufficient plainness to be easily apprehensible by every intelligent reader, and that the facts and arguments adduced in support of them will, at all events, suffice to ensure conviction of their truthfulness—a conviction so distinct and certain as to impel every medical man in whom it is produced to investigate experimentally in order to determine for himself what, in reality, is the amount of remedial power, and what is the extent of range of applicability of Neuro-dynamic Medicine.

London: 25 Somerset Street,
Portman Square, *Dec.* 1872.

ERRATA.

N.B.—An unfortunately long list of errata will be found at p. 496 : *it is earnestly requested that the reader will make the necessary corrections before proceeding to read the work.*

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NEURALGIA:

ITS NATURE, CAUSES, AND TREATMENT.

CHAPTER I.

PHENOMENA OF NEURALGIA.

That morbid condition of the nervous system commonly called Hysteria is often characterised as a *protean* disorder; and the epithet may, with almost equal justice, be applied to neuralgia; for the number and variety of shapes which it assumes are scarcely less, or less astonishing than those of hysteria itself. The term neuralgia is usually understood to denote violent pain without "manifest inflammation" in the "trunk or branch of a nerve, occurring in paroxysms of irregular duration, and after either irregular or regular intervals." But no definition, however carefully framed, can convey an adequate idea of the various kinds of neuralgia, together with the morbid phenomena often associated with it. Moreover, students of the disease have contemplated its paroxysmal aspects too exclusively, and hence have often failed to recognise it in its less impressive, but not less real character of subdued and more or less continuous pain. The mania for discovering and describing what are called "new species" still infects pathology even more deeply than zoology, and its blinding influence prevents those who are affected by it from seeing any but what are called "typical forms" of disease; the intervening varieties, by which these "types" are connected and gradually merged into each other, are, generally, either ignored, or, if dimly discerned, are passed over in silence. But in fact the least characteristic kinds of disease are incomparably more abundant than those on which professors of pathology are wont to concentrate the attention of their pupils; and this remark is especially

true of neuralgia, which, while presenting itself in an astonishing variety of typical aspects, is discoverable a thousand-fold more frequently in the less obtrusive guise of simple "aches and pains," which, though in some cases sufficiently severe to rob life of its pleasure, and even gravely to impair the general health, never develop into those agonising paroxysms, the image of which is now so intimately associated with the word neuralgia that it is almost impossible to dissever them.

The various Kinds of Neuralgia may, as it seems to me, be comprised in so far as pain only is concerned, under the following heads:—1. Pain occurring in paroxysms, with intervals of complete freedom from suffering. 2. Pain occurring in paroxysms, with intervals, during which periods of complete freedom from suffering and of dull aching alternate with each other. 3. Pain occurring in paroxysms, with intervals, during which it is greatly subdued, but still continuous. 4. Pain more or less intense and continuous, but never developing into violent paroxysms.

The Character of the Pain experienced differs exceedingly in different cases, and is, in fact, of almost every conceivable kind and degree: in some remarkable cases the sufferer seems to concentrate within the range of his or her experience all the various forms of neuralgic torment. The pains incident to dentition; the so-called "growing pains" of childhood and youth; the pains often preluding or accompanying the catamenia; breast-ache and knee-ache, to which women are peculiarly liable; and the fugitive pains often felt by "nervous" people of both sexes and of all ages, are examples of the more common and least severe forms of neuralgia. Its most terrible aspects are those which it assumes when it develops itself with such overwhelming violence that it may be likened to a thunder-storm, and, indeed, in some cases with a suddenness comparable only to that of lightning itself. The different victims of these overwhelming attacks describe their excruciating agonies very differently, and if a considerable number of their extremely various and intensely vivid pictures of their sufferings were collected together they would be found to comprise all the most striking and life-like imagery of human torment that language can depict.

The pain is most commonly described by one or more of the following adjectives—viz., excruciating, piercing, stabbing, shooting, crushing, plunging, tearing, thrilling; but patients often give very curious descriptions of their sensations: one, who experienced great pain in the eye, told me she felt "as if a string at the back and inside of her head were drawing her right eye backwards;" another, who suffered from frontal neuralgia, with pain also at the crown of the head, said, "the nerves from the top of the head to the forehead become very tight, and

then the attack comes on." In one case the pain is fixed at one spot, and recurs only in the same place; in another it is mobile; sometimes, as in facial neuralgia, for example, it occurs on one side, sometimes on the other. In some cases the pain is described as radiating from a central point, spreading outwards over a more or less considerable area, then, after a time, retiring, and finally ceasing at the spot where it began; in others it seems to follow the course of one branch of a nerve. "The pain," says Dr. Downing, "seems to shoot along the track, in the way we believe the electric telegraph traverses the wires of a telegraph. It is instantaneous, and causes an exclamation of surprise as well as suffering. The apparent velocity is, however, sometimes much slower. The pain creeps along in a feeble, continuous stream. Usually, the direction of the agony is from within outwards—from the centre towards the periphery. Occasionally it will take a retrograde course. More rarely it will traverse backwards and forwards, or rather inwards and outwards alternately."

Premonitions of Neuralgia.—Neuralgic attacks are not unfrequently described as sudden and without warning; but though the outset of the pain is often sudden, and though the heralds of it frequently escape observation, characteristic premonitions, if duly looked for, may be observed in a large proportion of cases. Valleix noted their presence in six-sevenths of the cases of which he has given an analysis, and though, when referring to facial neuralgia, Romberg says, "there are generally no premonitory symptoms," he adds, "but occasionally, a sense of tension, itching, or creeping precedes." Adverting to the general characteristics of neuralgia, Copland states that, "the pain of neuralgic affections sometimes is slight and obtuse at its commencement, and augmenting in violence with more or less rapidity. . . . In some cases the attack is preceded by nausea and general disorder, with more or less of derangement of the digestive and biliary organs; and in others by anxiety at the præcordia, by slight dyspnœa, or by slight chills followed by heat. At the commencement the pain is attended by numbness or torpor and formication." "Neuralgia may be abruptly developed, but in the great majority of cases," says Dr. Flint, "there are premonitions." And Professor Aikin observes, "The attack is sometimes sudden, but more generally it is preceded by a dull aching pain at the points where the nerve issues from the cranium, or becomes superficial." Anæsthesia of the affected part as a frequent herald of neuralgic paroxysms, is recognised by almost all observers; but of course until a patient has once suffered an attack he is not likely to note and report those peculiar sensations, here alleged to precede it, and the ominous significance of which he

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only learns to appreciate fully from the fitful or prolonged tortures which succeed them.

The Paroxysms of Neuralgia are very different, and come on in widely different ways in different persons. Sometimes their onset is gradual, sometimes remarkably sudden. In one case a person who has probably experienced some of the symptoms already enumerated, but who, if about to be attacked for the first time, thinks little of them and disregards them, and who, if asked respecting his health would describe it as fairly good, may find himself all at once the victim of intense pain, which has come on without any obvious cause. After continuing for a time, the length of which differs exceedingly in different cases, it subsides almost as suddenly as it arose, and the patient's general health seems to have been either unaffected or but very slightly impaired by the attack. In another case, a person of delicate "nervous" constitution, who suffers from frequently recurring head-ache, more or less constipation or irregularity of the bowels, and fugitive pains in various parts of the body, will at length be attacked with excruciating agony at some one fixed spot during a period varying from a few minutes to several hours. After the violent pain has subsided the patient may find himself in much the same state as he was in before the attack, but most probably he will experience more or less dull aching, and it may be numbness of the affected part. It is, of course, only in cases of paroxysmal neuralgia and during the paroxysm that the several phenomena, which are usually described as characteristic of the disease, are observable in their most striking aspects. Often not more than two of them are associated in one case; they cannot all present themselves together, but most of them may do so, and then, in a case of facial neuralgia for example, the patient may be simultaneously the victim of tearing or stabbing pains, hideous contortions of the features, glistening redness, heat, swelling and extreme tenderness at the painful part, an excessive secretion of nasal mucus or of saliva, an abundant trickling of tears from the eye on the side which is the seat of pain, and possibly free perspiration limited also to the same side.

The recurrence of the paroxysm of neuralgia is one of its characteristic features. It does not, it is true, recur in every case, but in the great majority of cases it does so. Moreover, in the worst cases, the number of attacks within a given period increases as time advances, while the attacks themselves are apt to become more severe and of longer duration. In other words, the paroxysms lengthen and the intervals shorten. In some cases, especially of patients who have had ague, or who have been exposed to malarious influence, the paroxysms recur with a regularity as wonderful as that which distinguishes ague itself,

and have even been known to imitate that disease still more closely, by becoming quotidian, tertian, quartian, &c., just as ague-fits do. When not recurring at periods like those of ague, neuralgia often manifests, nevertheless, a remarkable tendency to periodicity. Sir Charles Bell, in describing one of his cases (No. 80), says: "The pain is periodic; it has not varied, in the time of its return, five minutes for eleven weeks. It attacks her at one o'clock in the morning whether she be asleep or awake. . . . It continues from one till eight." A patient who came under my care on account of paralysis of the left lower extremity, following sciatica, which recurred every day during upwards of two months, experienced the onset of the attack regularly each morning a little after five o'clock and was literally agonized by it until between nine and ten, or nearly five hours every day throughout the whole period. In many cases, however, the tendency to periodicity is not obvious, and frequently when it is, the intermission is not complete. Occasionally the attacks come on in groups of several paroxysms in quick succession, each group being followed by a considerable interval. The length of the interval between each paroxysm, and between each group of paroxysms differs greatly, of course, in different cases. The point of attack of a recurring neuralgia is generally the same on each occasion; nevertheless, cases in which the paroxysms of pain change their seat suddenly and are experienced successively in various parts of the body, are occasionally observed.

Inter-paroxysmal Neuralgia differs greatly in character in different cases. The pain may be of a gnawing, dragging, or stabbing kind, like to that felt during a paroxysm only greatly subdued or comparatively slight; it may recur again and again in some one of these characters, or as a succession of slight shocks; whatever its character it may alternate with completely painless intervals, varying in duration from a few hours to several days; but it may also be continuous from the cessation of one paroxysm to the onset of another. In this case it is generally a dull subdued aching just sufficient to keep the patient always conscious that his invisible enemy remains near at hand. It seems as though the violence of the paroxysm had so far destroyed the capacity of pain in the affected sensory nerve-cells, that they need a period of rest and restorative nutrition before they can again become susceptible of tumultuous action, and that meanwhile the "dull subdued aching" denotes at once their morbid irritability and the feebleness to which their previous excitement has reduced them.

Non-paroxysmal Neuralgia, though the least terrible, and therefore the least impressive of the several kinds of neuralgia, is

the most common of all. No observant person visiting a dispensary or the out-patients' room of a general hospital can fail to be struck by the fact that a large proportion of the maladies complained of consist merely of pain, having no obvious cause. Indeed, the poor seem to be peculiarly liable to pains of this sort—pains experienced in all parts of the body, but most especially in the head, back, and chest. Neuralgic affections of the head, without any paroxysmal tendency, are often complained of as headache, and, indeed, are often associated with true headache, from which, however, they are easily distinguishable in most cases by the co-existence of some degree of swelling and tenderness of the integument. Prolonged aching of various parts of the scapular region, of the front of the chest, and (in women) below the left mamma, is of very frequent occurrence; ovarian pain is also very often of long continuance; but probably the most persistent of all pains having no *obvious* organic cause, is "back-ache"—a malady seated generally in the dorso-lumbar region, and with which a very large proportion of women, especially those of the lower class, are, unhappily, only too familiar. Of course, neuralgia of a non-paroxysmal kind may affect any part of the body, but according to my observations, it occurs less frequently in the extremities, and its most characteristic types are those just mentioned.

Morbid Appearances at the Seat of Pain are in many cases not observable, even when the malady assumes its severest forms; and in these cases, so far from there being any tenderness, pressure on the painful part will sometimes give slight and temporary relief. It is the consideration too exclusively of such cases which has caused neuralgia to be regarded by physicians as a pathological puzzle, and which has given rise to those misleading designations—"non-organic" and "immaterial" neuralgia, phrases which, if they mean anything, mean that functional disorder can exist without structural disorder; or in other words, that within the region of disease the original miracle of creation is repeated, such a reality as that of acute pain being produced out of nothing. But we shall see hereafter that the axiom *ex nihilo nihil fit* holds good with respect to neuralgia, at all events, and that the most "immaterial" neuralgias have a very material origin indeed. I can adduce no statistical evidence of the relative frequency of occurrence of cases of neuralgia, with and without morbid appearances, at the seat of pain. In slight cases they are rarely observable; in severe cases they are often present, and not seldom enforce attention in a very striking way. The most impressive of these phenomena are those of

(*a.*) *Disorderly Muscular Action.* In many cases in which the

pain is paroxysmal and intense the affected part distinctly vibrates, as if quivering with the agony; in others the muscles are more or less violently convulsed, and when in such cases the face is the part attacked, the contortions of the features become almost as dreadful to the beholder as they are painful to the sufferer. The facial muscles of some patients assume a slightly tetanoid condition—a feeble, but prolonged spasm, which imparts a fixed and peculiarly stolid expression to the countenance. Occasionally there are slight, subdued convulsive movements—twitchings—of a few muscles, or even of a single muscle, recurring at intervals. The most common muscular disorders associated with neuralgia are, however sudden jerks of one or other of the limbs, and as these usually accompany equally sudden onsets of darting pain, the patient is apt to jump or start as if shocked by fright.

(*b.*) *Disorders of the Sense of Touch: Anæsthesia, Hyperæsthesia.* Neuralgic attacks are very commonly preluded, accompanied, and followed, by a morbid affection of the tactile sense, consisting in either a decrease or increase of perceptive power. When anæsthesia prevails it may be of any grade from slight obtuseness of feeling to extreme numbness; and in like manner hyperæsthesia may be so slight as to be only just appreciable, or so intense as to render even a draught of cold air on the part affected intolerable. Tingling and formication, or sensations as if the part were touched with "pins and needles" are also common experiences.

(*c.*) *Disorders of the Nutritive Processes at the Seat of Pain* occur in a considerable proportion of neuralgic cases. Sometimes the affected region is distinctively anæmic; in these cases its condition of comparative bloodlessness is associated with pallor, with coolness greater than normal, and often with a diminution of tactile sensibility. Sometimes, and by no means rarely, there is observable the group of phenomena constituting the symptoms of inflammation, viz., redness, heat, pain—distinct from that usually called neuralgic, and swelling. Occasionally, one of these symptoms is especially prominent, while the others are scarcely observable; and each of them is present in widely different degrees of intensity, in different cases. In one patient the painful part may be suffused with a faint blush, in another it may be crimson, or even dark red like the colour of mahogany. Not infrequently the local afflux of blood is considerable: arteries which, when in a state of health, are too small to be perceptible, often so increase in volume that they may be felt to be throbbing forcibly if the fingers be applied over them. Of course, the heat and swelling, and, generally, the pain inducible by pressure, are proportionate to the extent to which the nutritive processes of the part are abnormally intensified. In some rare cases, according to the

testimony of credible witnesses, a reddish streak along the path of the diseased nerve is observable—a phenomenon denoting that the inflammatory action is mainly concentrated on the nerve itself. Few pathological facts are more remarkable than that of the rapidity with which these imflammatory symptoms arise during, or rather *towards* the end of a paroxysm, and with which they subside soon after it is over. A lady, attended by Sir Benjamin Brodie, suffered from pain in her foot, coming on each evening and continuing some hours. Shortly after the onset of the pain "it was followed by redness of the skin, and tumefaction of the subjacent parts near the bases of the toes. These marks of inflammation continued to increase for some hours, and then subsided, leaving the foot of its natural appearance and free from pain. This state of things, at the time of my being consulted, had existed with little variation for several months." She was cured by quinine. In two cases of facial neuralgia, recently under my care, there was distinct swelling of the forehead during each paroxysm of pain; and when the pain ceased the swelling subsided. In one of these cases the swelling followed in about an hour after the pain began. In the other the patient complained of swelling as well as of pain in the roof of the mouth.

A certain amount of hyperæmia and of swelling often remains as a more or less permanent vestige of the attack. The dilated blood-vessels do not always speedily contract to their wonted diameters, and hence when the eye has been within the focus of attack, the conjunctiva, in which the vessels are especially observable, may be often seen to continue more or less hyperæmic for a considerable time afterwards. And in like manner, long subsequent to the subsidence of all acute symptoms, parts which have been notably swollen remain more or less infiltrated with serous exudation, and are thus thickened or enlarged. I have noticed this result of neuralgia repeatedly. In the case of a lady mentioned by Dr. Downing, "the integuments of the arm and shoulder were very much hypertrophied." In some cases the affected nerve is itself appreciably thickened; and in several instances *post-mortem* examinations have revealed, *inter alia*, a remarkable thickening of the bones of the skull.

The heat of the neuralgic part is, of course, greater than that of the surrounding region in those cases in which the other characteristic evidences of excessive activity of the vital processes in the affected part present themselves. Moreover, the patient is often conscious of a burning sensation at the seat of pain. Sir Charles Bell describes a case in which the patient experienced a "burning sensation," commencing on the left side of the tongue, and extending over "half the tongue and mouth, and face and head." He also describes a case of lingual neuralgia, the pain

of which was said to be "a burning and smarting—sometimes the whole mouth being affected, even down to the throat, burning like fire."

(*d.*) *Excessive Activity of the Secreting Glands* is a common accompaniment of neuralgia. The sweat and mucus glands are most frequently affected. Careful observers may almost always detect disordered activity of the sweat glands within and often much beyond the neuralgic area. It is by no means a rare occurrence for the patient himself, or, much oftener, herself, to note and report the fact that after a paroxysm of pain has been endured some time the affected part breaks out into a sweat, immediately after which the pain rapidly lessens. In some cases there is no such "critical" exudation, and perhaps, indeed, no notable sweat at all; while in others the painful region is bathed in perspiration throughout the whole period of the paroxysm. The most peculiarly interesting cases, in respect to this secretion, are those in which its morbid manifestation is bounded by the mesial line: these, of which several are on record, are especially instructive, for, while exemplifying how circumscribed may be the operation of that influence presiding over the functions of the sweat glands, they justify the inference that inasmuch as it is strictly unilateral it must be of nervous origin. Indeed, the same phenomenon also presents itself in the mucous membrane. Dr. Downing has pointed out that when the tongue happens to be implicated, and when only one half of it is painful, that half may be found "drier and whiter than the other. It is in a state of febrile excitement, while its fellow is quiet and healthy. The line of union between the two halves is beautifully marked." It must be added, however, that this is not a constant feature: I sought for it but could not find it in a case of neuralgia recently under my care, in which the affection was distinctly confined to one side of the tongue. But though this feature is not often notable, illustrations of the abnormal activity of the mucous glands are especially abundant. Facial neuralgia is often accompanied by a copious out-pouring of nasal mucus. Uterine neuralgia, as well as crural and sciatic, when occurring in women, is most generally associated with leucorrhœa; and diarrhœa, of which one element is an excessive activity of the intestinal mucous membrane, is also not infrequently associated with this affection. Excessive lachrymation is a common feature of frontal and ophthalmic neuralgia; and when the face is the chief seat of suffering a profuse flow of saliva often occurs. Moreover, in many cases in which the seat of suffering is in the trunk or some part of the lower half of the body, including the lower extremities, there is excessive activity of the kidneys, denoted by the frequent discharge of an abundance of pale urine. Even the re-

productive glands are not exempt from the general rule here laid down. Dr. Maculloch records a case of neuralgia in which the testes were so stimulated that during each neuralgic attack there was an emission of semen.*

The Extent of Neuralgic Attacks differs exceedingly in different cases, and not infrequently at different times in the same case. Those cases in which the disease is limited to one small region occur most frequently: supra-orbital, infra-orbital, and infra-mammary neuralgia are good examples of this kind. Sometimes the pain is limited to one spot of the diameter of a shilling, or half-a-crown; generally, however, while such a spot may be the focus of suffering, the pain seems to spread over a considerable area from that focus, and to diminish in intensity in the surrounding parts in proportion to their distance from it. Of the different kinds of neuralgia, sciatica, being an affection of the largest nerve in the body, has the widest range. In some cases of this malady the pain is limited to one part of the hip, but frequently, when the whole, or nearly the whole, of the nerve is involved, the entire lower extremity suffers. Indeed, I have seen several cases of double sciatica. Occasionally neuralgia attacks all four extremities simultaneously. There are also what are called *mobile* neuralgias—cases in which the points of attack are shifted more or less rapidly from one place to another, so that the disease ranges over the whole body. Slighter forms of suffering of this kind are described as "flying pains."

Tenderness of the Segments of the Spinal-cord related to the affected Nerves is generally, though by no means always, observable. Trousseau, finding this tenderness in the great majority of cases called neuralgic, gave expression to the doctrine that only those in which this phenomenon can be detected are truly so. He therefore insisted that its presence or absence is "a precious diagnostic sign," by which we may learn, in any given case, whether the pain experienced is a real neuralgia or not. But it would not be difficult to prove that this test, as a means of differential diagnosis, is fallacious. Indubitable neuralgia very often exists without perceptible tenderness of any part of the spine. Generally, however, this is the case only in the early stage of the disease; when it is thoroughly established, tenderness made manifest by pressure over the segments of the cord in which the affected nerve is centred usually becomes developed. Still, there are cases in which, at no period, is any such tenderness discoverable.

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* An Essay on the Remittent and Intermittent Diseases, including, generically, Marsh Fever and Neuralgia. By J. Maculloch, M.D., F.R.S ii. 142.

Occasional Concomitants of Neuralgia.—Among the most frequent of these is *headache*, which is especially liable to accompany the disease when it attacks the fifth nerve, and, of course, greatly aggravates the patient's sufferings. *Backache* is also very often complained of: this, most generally, is seated in the lower third of the spinal cord, is not infrequently associated with severe neuralgia of some part of the lower half of the body, and occurs much oftener in women than in men. *Asthma*, or a *tendency to spasm of the bronchial tubes*, is sometimes observable. Even in cases in which no asthmatic paroxysm has been actually developed, the existence of this tendency may often be recognised by the occurrence of wonderfully rapid changes in the colour of the complexion, which, in such cases, is apt to be fresh and clear at one part of the day and dull and dusky at another. The length of the periods within which these alternations occur, is, however, widely different in different cases. *Nausea and vomiting* are often experienced: in some cases they are associated with the neuralgic paroxysms, in others they occur from time to time during the intervals. Persons troubled with neuralgia of the abdominal or pelvic segments of the body are most prone to sickness. *Irregular action of the bowels* is, of all the concomitants of neuralgia, the most common, the most persistent, and the most defiant of remedies in the shape of drugs. Sometimes the disorder assumes the form of chronic diarrhœa, more frequently of alternate states of diarrhœa and constipation, most frequently of habitual constipation, and this is occasionally associated with preternaturally vigorous contraction of the sphincter ani, rendering the act of defæcation peculiarly difficult. *Excessive irritability of the bladder, producing incontinence of urine*, is very often met with in connection with uterine, crural, and sciatic neuralgia. Some patients experience this extremely distressing malady to so great a degree as to be compelled to micturate several times during each hour of the day. It is notably intensified by mental excitement and trouble, and, so far as I know, is wholly beyond the controlling power of every drug in the Pharmacopœia; happily, however, by virtue of the therapeutical method which I have elsewhere explained and exemplified, it is now placed in the category of curable diseases. *Uterine disorders—especially dysmenorrhœa and leucorrhœa*—are also common associates of neuralgia. Sometimes they operate as causes of it; but in a large proportion of cases they are produced by a morbid state of the nervous centres like to that which is the proximate cause of neuralgia; and very often neuralgia, dysmenorrhœa, and leucorrhœa are branches of one stem originated and developed by various primary causes which manifest themselves sometimes in one of these disorders, sometimes in another, and often in all three

together. *Habitual coldness of the feet* is experienced in many cases, and with respect to origin, is in women of the same sisterhood as the uterine maladies just mentioned. If the *constitutional tendencies* are ascertained in a hundred habitual sufferers from neuralgia, and are then compared with the constitutional tendencies of a hundred persons free from this affection, the former will be found more prone than the latter to those disorders commonly distinguished as disorders of the nervous system: hysterical, spasmodic, and even, but more rarely, paralytic tendencies, are often observable. Indeed, some form of hysteria, epilepsy, or paralysis, not seldom precedes, succeeds, interchanges, or co-exists with neuralgia, and the kinship of these diseases is undoubtedly very close. The affinity between neuralgia and ague has long been observed, and indeed, Dr. Macculloch has expressly propounded and advocated the hypothesis that the two diseases are essentially identical, that in fact, neuralgia is a kind of obscure, or undeveloped ague. To me this is only another form of stating that those persons in whom, from whatever cause, the circulation of the blood in any segment of the nervous system, instead of being normally stable and equable, has become unstable and variable, with a tendency to ebb and flow, as is the case in ague patients, are peculiarly liable to attacks of neuralgia. "Intercostal neuralgia occurs especially as a sequel of intermittent fever. It prevailed very extensively among the northern troops who returned from the Peninsula Campaign in Virginia, in 1861, where they had suffered much from malarious disease."*

The Aspect or Physiognomy of Neuralgic Patients does not, according to my observations, present any uniformly characteristic features; but that the expression of the countenance and the quality of the skin are often peculiar there can be no doubt. I have already stated that in the region of pain the muscles are often affected with slight tonic spasm, and sometimes are slightly convulsed. Now, when in cases of facial neuralgia the muscles are ever so slightly affected in this way, a certain fixedness is imparted to the expression; and if the vaso-motor nerves of the face be so influenced as to result in either abnormal contraction or dilatation of its blood-vessels, an unhealthy aspect consisting in slight diffused swelling with heightened colour, or undue pallor, or sallowness, will be induced. But if the neuralgia be located in some other part of the body, and if the bronchial tubes have no spasmodic tendency, the countenance is not likely to present any abnormal aspect, except during the paroxysms of pain, unless the patient resides or has resided in a malarious district, and has thus allowed his whole nervous system to

* Flint's "Practice of Medicine," p. 190.

become subject to that mysterious and morbid dynamic influence which malaria exerts.

The General Health of Neuralgic Patients.—Bearing in mind the intense agony of severe neuralgic paroxysms, the slight degree to which in many cases they impair the constitutional vigour is really astonishing. A recent writer, Dr. Anstie, says: "It is universally the case that the existing condition of the patient at the time of the first onset of the disease is one of debility, either general or special. I make this statement," he says, "with great confidence, notwithstanding the contrary assertion advanced by so high an authority as Valleix." Dr. Anstie has espoused a neuro-pathological theory which pre-supposes that sufferers from neuralgia, as well as from diseases of the nervous system generally, must be notably debilitated. I cannot help thinking that this theory inclines him to under-estimate the evidences of robustness, and to over-estimate those of debility presented by the neuralgic patients who have come under his care. Indeed, careful observers of this disease and its results cannot fail to be astonished with the smallness of the constitutional injury which is inflicted on some persons by its excruciating paroxysms—recurring at frequent intervals during many years. Two remarkable cases, in the treatment of which I had the good fortune to be successful, exemplify, in a striking degree, the truth of this statement. One of the patients had been a sufferer during fifteen, and the other twenty years, and yet in neither case was there any notable constitutional impairment except what might be mainly referrible to want of sleep. It is true that, in one of these cases, the nervous system had become so exhausted that the patient could do scarcely anything; but soon after permanent relief from the pain had been obtained and the system had been refreshed by normal sleep, her general health and strength proved to be fairly good. In the other case, the constitution and capacity of work were so little injured by the many years of frequently recurring as well as prolonged suffering and sleeplessness as to be a matter of astonishment to the patient. And, indeed, while it is surprising how much weakened some patients may be by one single but prolonged attack of excruciating pain, the testimony of many careful observers concurs in proving that in many cases when neuralgic sufferers who have been victims of the cruel malady for long periods, are delivered from their torment, they find their constitutions wonderfully little injured by it; and that even a considerable proportion of its martyrs who have consulted all the most celebrated medical oracles anxiously seeking relief and finding none, yet live on, often to a ripe old age, the term of their existence not being appreciably shortened by the disease.

CHAPTER II.

PATHOLOGICAL THEORIES OF NEURALGIA.

The theories concerning the nature of neuralgia which have been from time to time propounded are numerous and various, and, in some instances, diametrically opposed to each other. I will briefly advert to those which have been put forward in recent times, and as none of them appear to me satisfactory I shall, after characterizing each, endeavour to point out in what respects they are either inconsistent with some of the well-established facts of neuralgia, or are incapable of explaining some of the phenomena of the disease.

Fothergill regarded neuralgia as a result and expression of the cancerous diathesis. Neuralgic pain is certainly liable to occur in persons having this constitutional tendency; and it is not improbable that the frequency with which the irritative action of cancerous tumours produces neuralgic affections may have suggested to Dr. Fothergill his idea of the relation between neuralgia and cancer. But, inasmuch as the great majority of sufferers from neuralgia exhibit no trace of cancerous disease, Dr. Fothergill's doctrine has been generally discredited by the profession. I shall endeavour to show, however, at a subsequent page, that the immediate causes of cancer and of neuralgia may be very nearly connected, and therefore that Dr. Fothergill's idea is not so groundless as is commonly imagined.

The opinion of Dr. Macculloch that neuralgia is "a mode or variety of intermittent" fever deserves especially respectful attention.* His careful study of marsh fever and neuralgia could scarcely fail to impress him with a conviction of the remarkably close affinity between these two diseases, and it is not surprising that he came to believe them identical. Indeed, they were so, no doubt, in a considerable proportion of those cases which he observed. The very frequent occurrence of neuralgia in persons who have either had ague, or who are exposed to malarious influence is a fact so well attested that pathologists could not fail to speculate on the probability of a common origin of the two diseases.

* On the Remittent and Intermittent Diseases, including especially Marsh Fever and Neuralgia. By J. Macculloch, M.D., F.R.S. 1828. II. 1.

As already said, intercostal neuralgia prevailed extensively among those troops of the United States Army who had previously suffered much from malarious disease. Moreover, ague and neuralgia are often cured by the same remedies, and those remedies are constitutional ones whether the disease be local or general. Dr. Macculloch erroneously observes that these diseases, "in all their forms, are cured by the same remedies." Were this statement true, his hypothesis of the identity of their nature and causes in all cases, if not a true one, would, at least, be far more acceptable than it actually is. But, in fact, the great majority of persons who suffer from neuralgia have never been exposed, so far as can be ascertained, to malarious influence, and certainly have never suffered from any form of ague. It is true that neuralgia, in a large proportion of even those cases in which no trace of a malarious origin can be detected, presents an intermittent and regularly periodic character, but the tendency to periodicity is an aboriginal element of living organisms and, though as a morbid phenomenon it is exhibited most strikingly as one of the symptoms of malarious fever, it presents itself also as a feature of many other diseases. Therefore, the fact that it shows itself in its most striking aspects as a leading symptom of both ague and neuralgia, cannot be held to prove the truth of Dr. Macculloch's doctrine. It is but too well known that those medicines, viz., quinine and arsenic, which are so peculiarly efficacious in the treatment of ague, often afford but slight palliation of neuralgia, and, in a large proportion of cases, fail altogether to cure the disease. Moreover, inasmuch as quinine exerts a curative control over diseases having a tendency to periodicity originated quite independently of malarious influences, and over those having no such tendency, the fact that quinine cures neuralgia in some cases is not adequate to sustain the argument which is built upon it. But the most decisive confutation of the theory in question consists in the large amount of experience now accumulated, proving incontestibly that neuralgia may be produced by a great variety of causes, some of them being of a purely mechanical nature, such, for instance, as the presence of a small splinter, or of other foreign substances in any part of the body.

Local irritation of nerves has been considered, from the earliest times, as the cause of neuralgia; and this doctrine was concisely formulated by Pinel, who said—"Different observations seem to necessitate the conclusion that in neuralgia there exists a material cause of irritation adherent on the nerve; that this cause is not the same in all cases, and that, therefore, it is necessary to recognize it in order to establish an efficacious treatment." But it is well known that in numerous cases of neuralgia, in which an opportunity of *post-mortem* examination has occurred, the most

elaborate search has failed to reveal the presence of any morbid growth or foreign body adherent to the affected nerve. According to the united testimony of Dr. Elliotson, Sir Charles Bell, Magendie, Dessault, Martinet, Sir Astley Cooper, Andral, and, I may add, many other eminent pathologists, no trace of organic lesions of the affected nerve is discoverable after death in a large proportion of neuralgic cases. Moreover, we know that temporary irritation of a seemingly slight kind, and, *prima facie*, wholly incapable of producing such remarkable results, do, nevertheless, sometimes cause, through the agency of reflex action, the most excruciating agonies in parts of the body far removed from the seat of irritation. Two cases related by Sir Benjamin Brodie, and which have been often quoted, are good illustrations of this statement. Dr. Wollaston, having eaten some ice cream after dinner, became lame from a violent pain in one ancle ; he suddenly vomited—thus getting rid of the ice cream, and was instantaneously relieved of the pain in the foot. Another gentleman awoke in the night with severe pain in the foot, and feeling that he had an unusual quantity of acid in the stomach, swallowed a large dose of alkaline medicine. Immediately afterwards the pain in the foot left him. Dr. Downing mentions a case of a gentleman "who is subject to a kind of facial neuralgia whenever the stomach is deranged ; although other causes, such as foul air, a heated theatre, etc., will equally excite it." While these cases, and a crowd of similar ones which might be adduced, prove that very frequently neuralgia is of a purely dynamic nature, and that it originates in local irritation, they also prove, not less conclusively, that the disease very often exists independently of any such morbid affections of the nerves as those alleged by Pinel to constitute its proximate causes.

Congestion, and arterial hyperæmia of various grades, sometimes proceeding to the extent of inflammation of the painful nerves, have also been considered as the immediate causes of neuralgia. Bichat (who is quoted by Swan) says : "I preserve the sciatic nerve of a subject who suffered very acute pain in its course, and which presents at its superior part a number of small varicose dilations of veins penetrating it." The Baron Larrey who observed in some cases that the affected nerves were obviously inflamed, and occasionally might easily be felt in the form and of the firmness of small violin strings, maintained the doctrine that tic-douloureux consists in "a chronic and inflammatory turgescence of the neurilemma which envelopes the nerves of the part affected. Descot, Montfalcon, and others," referred to by Dr. Downing, "write to the same effect." The morbid condition of the affected nerves, which has originated this pathology of neuralgia, is often observable, and in

some cases is so pronounced as to be very striking; in many cases the whole region of pain is hotter than normal, and indeed exhibits all the usual signs of inflammation, and not infrequently a track along the line of the affected nerve is distinctly redder, hotter, and far more sensitive than the adjacent parts. If these phenomena of local hyperæmia or inflammation were present in all cases of neuralgia, it might not be difficult to recognise in them the proximate cause or essential nature of the disease. But the credibility of this hypothesis is completely destroyed by the well-established fact that one of the most striking and mysterious characteristics of many cases of neuralgia is the total absence of any symptom of inflammation, or hyperæmia, in the painful region. In fact, some writers describe typical neuralgia as unaccompanied by any evidence, except the pain, of departure from health in the neuralgic region. Copland says,—"Generally, neither redness, heat, nor swelling of the part can be detected."* And Dr. Downing remarks,—"The most intense agony may exist in a part without affording the slightest sign of disturbance. On this point all authorities are agreed."† Indeed, not only are these statements indubitable, but in some cases, so far from there being hyperæmia, there is actual anæmia of the affected part. Sir Charles Bell, in a comment on one of his cases, No. 90, says that he has had patients who complained of partial and extreme coldness, and in whom the neuralgic part—the side of the face, for example—was "remarkably lowered in temperature."‡ Descot, referring to facial neuralgia, observes,—"Quelquefois la face pâlit et devient livide."§ Swan testifies to the like effect.‖

Sir Henry Halford suggested an hypothesis that neuralgia "is connected with a preternatural growth of bone in some part of the animal economy where it is not usually found in a sound and healthy condition of it, or with a diseased bone." Sir Henry bases this view upon the fact of the existence of a remarkable thickening of the skull, which was discovered by *post-mortem* examinations of three fatal cases of the disease, which he mentions, and on the facts that one of his patients suffering from "rending spasms" of tic-douloureux was cured by the extraction of a tooth having a large exostosis on its root, and that another recovered immediately after the exfoliation of a portion of bone from the antrum of Highmore. Such a theory as this could

* "Dictionary of Practical Medicine:" Art. Neuralgia.

† "Neuralgia: its Various Forms, Pathology, and Treatment." London: 1851, p. 15.

‡ "The Nervous System of the Human Body," p. 364.

§ "Dissert. sur les Affections locales des Nerfs." Paris: 1825, p. 134.

‖ "A Treatise on Diseases and Injuries of the Nerves." London: 1834, p. 6, *et seq.*

never have been entertained by a physician of Halford's extensive experience had not the pathology of neuralgia been beset with difficulties so extreme as to cause the most sagacious and practical men to look favourably on any doctrine which seemed to offer the least clue to the track by which this mysterious malady could be investigated and explained. Sir Henry Halford freely admits that there are other cases in which no such immediate cause of irritation can be discovered, and accounts for their production by the action of sympathy.* In doing so he has virtually surrendered the doctrine which he had previously propounded; and I do not think it is now necessary to expend any words in its confutation, the more especially as I shall hereafter show that the thickening of the skull, on which he relies for its support, is a consequence, not a cause, of the disease. I may, however, observe here, that though he held the opinion that the preternatural growth of bone operates causatively, he has wholly failed to show how it does so. No evidence is adduced proving that in the case in which the skull was thickened the fifth nerve was anywhere compressed by the abnormal bony growth, and Sir Henry Halford does not appear to have borne in mind that, as a general rule, the less vital textures give way to the development of the more vital, and that solid bone itself is, in a certain sense, softer and more pliable than nervous tissue, by which it is moulded and adapted to its own form. I may add the pertinent and important fact recorded by Romberg,† that in a case of facial neuralgia, which proved fatal, and which was found on *post-mortem* examination to be due to an aneurism, within the cavernous sinus, of the left carotid artery, the "cranial bones were hypertrophied, being from four to five lines in thickness; the external lamella was unaltered; the diploe had disappeared; and the internal lamella had a diameter of about four lines, was somewhat porous, but on the whole firm and dense in texture. The inner surface of the calvarium was very uneven, the meningeal arteries running in deep grooves, towards which the bone was bevelled off, so as to offer the greatest thickness in the middle between two arteries."

The proximate cause of tic-douloureux, according to Sir Charles Bell, consists in morbid influences of the abdominal sympathetic on the tri-facial nerve.‡ But this is only equivalent to the statement that facial neuralgia may often be induced by irritating substances in the bowels, acting as *exciting* causes of the malady. That it is also due to many other exciting causes acting through other parts of the organism is quite certain. In proof

* "Essays and Orations," p. 48.

† "Manual of the Nervous Diseases of Man." Translated and Edited by E. H. Sieveking, M.D. Vol. I., p. 41.

‡ *Op. cit.*, pp. 350, 355-6.

of this hundreds of cases might be cited, but I will only refer to the two of Sir Henry Halford's cases already mentioned : it was proved conclusively that the disease was due in one case to an exostosis on the root of a tooth, and in another to disease of part of the bone of the antrum of Highmore.

Swan's idea is that the disease is due to two diametrically opposite conditions of the circulation of the blood in the part affected. He believes that hyperæmia and anæmia may alike produce the disease. He says,—"In those cases of painful affections of the nerves in which the limb is cold, and the pain is prevented or relieved by warmth, I conceive the languor of the arterial circulation may favour the congestion of the veins of the nerves, and thus produce distension of their fibrils." And further on he remarks, "that the blood-vessels have a principal share in the production of pain in some cases may be inferred from their increased size in nerves that have long been thus affected." He then observes : "It may appear strange that a complaint of this sort should be produced by two such opposite states of the body, and that it should continue longer in a debilitated person than in a plethoric one ; but when the body is strong, the nervous system is generally not irritable."* In those cases in which the nature of the malady seems most to justify the application to it of the epithet peripheral, or eccentric neuralgia, Swan's conception of the nature of its most immediate causes is at first sight apparently correct. But even in these cases the excessive or defective circulation, which seemingly induces the disease, is due to primary or secondary disorder in the vaso-motor nerve centres governing the circulation of the parts in question. Moreover, all those cases in which there is no appreciable disturbance of the vascular system at the seat of suffering, are left inexplicable by the hypothesis in question ; and as it is well known that in many of these cases in which there is such disturbance the application of cold or heat to the affected part very often fails to do more than effect a slight and temporary palliation of the symptoms, the inference is legitimate that the real seat of the disease is in some part of the nervous centres themselves.

Dr. Downing, who appears to be fully sensible of the inadequacy of every hypothesis previously propounded, says,—"The proximate cause of tic-douloureux we may conclude consists in an abnormal irritability of the nervous fibre ; a preternatural local exaltation of function, without corresponding excitement of the vascular system."† He thinks that this irritability of the nervous fibre is associated with, or results in, morbid contraction of the neurilemma, which he supposes to be "susceptible of extraordinary

* *Op. cit.*, pp. 7, 10, 11.

† *Op. cit.*, p. 87.

excitement under disease," and that "by compressing and extending the neuril matter," it gives "rise to the severest local pains;" and afterwards he says, by way of conclusion of his section on the proximate cause of neuralgia, it "would appear to depend essentially on a *morbid excitability* of particular *nerves* or parts of nerves leading to *violent and painful spasm of their fibres.*"* I shall not attempt to controvert the reasoning by which this author endeavours to justify his supposition of the contractility of the neurilemma to the extent here implied, or of the possibility of its compression of the within-contained neuril matter, so as to produce the severest local pains, or, in short, of the possibility of painful spasms of nerve fibres. Of course, if such possibilities, unassociated with any appreciable disturbance of the local circulation, could be indisputably established, it would enable us to conceive that all forms of neuralgia might consist in the morbid condition here alleged. But the hypothesis is open to the fatal objection that when the nerve, which is the apparent seat of the disease, is divided, or when the part of it in which the pain is felt is excised, the disease almost invariably continues to exist. Dr. Downing has himself collected numerous cases in which either the affected nerve has been divided, or in which a portion of it has been cut out, and he candidly says, "the result of these operations are variable, but, on the whole, unsatisfactory."

The doctrine most recently propounded concerning the pathology and etiology of neuralgia is that put forward by Dr. Bland Radcliffe, and re-inforced by Dr. Anstie. Dr. Radcliffe says, "there is reason to believe that pain of a neuralgic character is to be regarded as a sign of defective vital power in general, and of defective nerve power in particular, and not of a contrary state of things."† And Dr. Anstie thinks "it most probable that in *all* cases of neuralgia there is either atrophy, or a tendency to it, in the posterior or sensory root of the painful nerve, or in the central grey matter with which it comes in closest connexion."‡ Adequately to discuss and criticise the theory espoused by these two well-known physicians, I should be obliged to occupy many pages; but happily this is not necessary. In the following exposition of my own views concerning the pathology of neuralgia I shall develop a doctrine exactly the reverse of that which is expressed in the sentences just quoted, and as I shall give my reasons for holding that doctrine, those of my readers who may consider those reasons valid will, of course, see in them an implicit confutation of the remarkable theory of Drs. Radcliffe and Anstie.

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* *Op. cit.*, p. 97.

† "Lectures on Epilepsy, Pain, Paralysis, and Certain Other Disorders of the Nervous System." By C. B. Radcliffe, M.D. 1864. P. 307.

‡ Article on "Neuralgia." By F. E. Anstie, M.D., F.R.C.P., in Reynolds' "System of Medicine," Vol. II., p. 742.

CHAPTER III.

THE PATHOLOGY OF NEURALGIA AND ITS COMPLICATIONS.

What a True Theory of Neuralgia implies.—The various pathological views of Neuralgia which have been from time to time propounded are, as it seems to me, and as intimated in the preceding chapter, far from satisfactory. It may be stated generally that while each offers a plausible explanation of some one form or aspect of the disease, it fails to account for the numerous and extremely different symptoms which it presents in different cases. I have entitled this chapter "The Pathology of Neuralgia *and its Complications,*" and intend to denote by the words—"its Complications," certain morbid phenomena, some one or several of which may be associated with the pain. Now, if neuralgia is so frequently accompanied by one or several of the phenomena in question as to constitute them characteristic features of the disease, it is manifest that any pathology of it which, even though it may offer a seemingly satisfactory explanation of the various aspects of the disease itself, fails to give a complete *rationale* of the essential nature and mode of production of its kindred disorders, or complications, must be pronounced unsatisfactory. Moreover, the explanation offered of any individual phenomenon must harmonise with the explanation offered of every other phenomenon of the disease; for the manifold physiological appearances, whether normal or morbid, produced simultaneously in any part of one and the same organism, are expressions in different structures, or through different agencies, of fundamental conditions, which are either essentially cognate or completely identical. Having regard to these elements of the problem—What is the proximate cause of neuralgia and its complications? I am bound to say that this problem has not yet received a satisfactory solution.* There is

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* "Of the exact nature of this neuralgic state," observes Sir James Paget, "indeed, we know nothing; but of its existence as a morbid state of nerve-force, or nervous action, we are aware in many cases, in which we can as yet trace no organic change, and, in many more, in which the sensible organic change of the nerves is inadequate to the explanation of the pain felt through them."—"Lectures on Surgical Pathology." Third edition, p. 495. Rosenthal and Eulenberg have expressed themselves to a similar effect: the passages conveying their opinions on the point in question will be found translated at page 253.

therefore ample sphere for further research and speculation concerning this obscure disease. If it shall seem that I have contributed in any considerable degree towards the elucidation of the subject, my success must be mainly ascribed to the fact that I have fortunately held in my hands a valuable instrument of experimentation and verification, which other labourers in the same field have not had the advantage of using.

Obstacles to the Development of a True Theory of Neuralgia.—It appears to me that the acquisition of exact knowledge and correct views concerning neuralgia has been retarded by the general prevalence of two misconceptions:—

(1.) It seems to be generally thought that the proportion of cases of this disease in which there are no symptoms appreciable by the observer at the seat of pain is very much greater than it really is. While recognising that such cases not infrequently occur, I feel assured that when physicians, who are guided in their search by a correct knowledge of the phenomena they are looking for, shall carefully note all they observe, the common descriptions of the symptoms of the disease will be found to need considerable correction, and that the proportion of cases in which there is distinctly observable local disorder will be seen to be far greater than is now generally supposed.

(2.) The existence of a disease consisting apparently of acute pain only, which in certain cases is indubitably established, and the exaggerated views, just adverted to, as to the frequency of its occurrence have originated and fostered the conception that there is such a thing as "non-organic or immaterial neuralgia"—a pathological error, as it seems to me, of the first magnitude. The phrase "functional disorder" may be, as no doubt it is, a convenient one if intended to denote morbid conditions expressive of structural changes which, though admitted to occur, baffle our efforts to detect them; but if used to express the idea that functional diseases exist *per se*—and it seems to be thus used very often—it can only produce mental confusion; for such an idea is wholly opposed to the teachings of physiology, and is alien to the spirit of that scientific method by which alone we can hope to conduct medical investigations to a successful issue.

Notwithstanding the well-ascertained fact that there are numerous cases of neuralgia in which no phenomenon except that of pain is observable, I cannot conceive, as Dr. Handfield Jones does, of, what he calls, "non-organic or immaterial neuralgia;" but I believe, without the least shadow of a doubt, that all functional disorder is expressive of structural change. This proposition is, I am persuaded, only seemingly contradicted by the fact that in some cases of neuralgia there are no visible evidences of morbid change at the seat of pain. The seeming contradiction is easily

explicable : all pain is expressive of *centric* disease—but of disease varying from the slightest temporary disorder to the most serious and irremediable morbid transformation—whether the pain has an obvious eccentric cause or not, and although, as Romberg says, "Every sensation, as it becomes perceptible to consciousness, is referred to the periphery of the sensitive fibre, the entire tract of which, from its commencement to its terminal point, is susceptible of the impression."

Summary Statement of the Author's Theory.—The theory which I believe adequate to explain all the phenomena of neuralgia, which indicates a successful method of treating the disease, and the truth of which seems to be proved by the results of its practical application, may be stated in the following propositions :—

(1.) That pain, whatever may be its exciting cause, and whatever may be the structure in which it is felt, is, like ordinary sensation, a phenomenon of functional change in the sensory centre into which the affected nerve is rooted.

(2.) That the nature of the functional change denoted by ordinary sensation, and the nature of that denoted by pain, are essentially identical, the difference between the two being only a difference of degree of rapidity or intensity with which the change occurs.

(3.) That pain, like ordinary sensation, is of various degrees of intensity, and that whereas pain denotes a more rapid functional change in the affected sensory centre than occurs during ordinary sensation, the successively higher degrees of intensity of pain are expressive of successively higher degrees of rapidity of functional change in the functioning sensory centre.

(4.) That whereas an indispensable condition of those functional changes in the sensory centre which are comprised within what may be termed the ordinary sensory scale is a normal supply of arterial blood—in order to provide for those transformative changes which are at once chemical and nutritive, and which constitute the ground-work and possibility of functional change, so a supply of arterial blood greater than normal is an indispensable condition of those more intense functional changes in the sensory nerve-centre comprised within the wide range of what may be called the neuralgic, or, more generically, and perhaps more correctly, the *algic* scale.

(5.) That pain is not necessarily a morbid phenomenon; that in its beginnings it is rarely, if ever, so in otherwise thoroughly healthy organisms; but that if, in such organisms, the operation of its exciting cause be long continued it will induce in the affected sensory centre a habit of morbidly intense functional activity, so that at length, when that habit is generated, it will persist even after its cause is removed.

(6.) That a neuralgic habit thus generated may be transmitted hereditarily; and that, though it may remain latent during a considerable time, it may be suddenly lighted up by some exciting cause so slight as to escape observation, and thus constitute in the second generation what is sometimes designated spontaneous or idiopathic neuralgia.

(7.) That the general doctrine expressed in the foregoing propositions in respect to pain is, *mutatis mutandis*, applicable to the several phenomena constituting the complications of neuralgia, which consist generically in disorderly actions of muscles—voluntary and involuntary, of morbidly excessive actions of glands, and of disorderly processes of local nutrition.

Proof that the Algic Nerve-centre is Hyperæmic.—The proposition that there is hyperæmia of the affected nerve-centre in all cases in which pain is felt is, in my opinion, susceptible of decisive proof; for, as I shall hereafter show, by exerting a sedative influence over the spinal centre of a painful nerve, the pain may be abolished; whereas, by exerting a stimulant influence over the spinal centre of a nerve prone to neuralgia, but not actually painful at the time when the stimulus is applied, the pain may be reproduced.

Classification of the Several Kinds of Neuralgic Disorder.—I shall now advert to the several kinds of neuralgic disorder, and, with the assistance of the general principles just laid down, shall endeavour to render their essential nature or proximate causes easily apprehensible and intelligible in each case. I shall arrange them into six groups, as follows :—

GROUP I. : *Cases without any Complication or discoverable Eccentric Cause.*—These comprise those cases of disease of sensory nerve-centres which have been distinguished as cases of "pure and uncombined neuralgia," and which are designated by Dr. Handfield Jones "non-organic or immaterial." In these cases there is no appreciable reflex action in any direction, and therefore apparently no complication of any kind; and the pain, having no obvious cause, is referred to some part of the periphery seemingly healthy.

The essential peculiarity of the disease in these cases consists, I apprehend, in its *limitation* to those centric nerve-cells, or tracts of grey matter directly connected with the sensory nerve, or nerves, morbidly implicated. If, as presumed, the malady does not extend itself centrically to neighbouring nerve-cells related either to other sensory nerves, or to one or other of the three kinds of motor nerves which will be hereafter adverted to, it is not appreciably reflected in any direction, but tells of its exist-

ence only by the presence of pain, the seat of which is referred to the periphery of the sensory nerve or nerves immediately connected with the affected cells. But according to the doctrine enunciated above, the disease in these cases is as thoroughly organic and material as it is in those in which the pain is associated with the most striking morbid phenomena within the region to which the pain is referred. That it is so, and that the organic or material element underlying and immediately causative of the pain, is hyperæmia of the affected nerve-centre, I have proved experimentally in a large number of cases.

GROUP II. : *Cases without any Complication, but having a discoverable Eccentric Cause.*—These comprise those cases which, though like the cases constituting Group I. in respect to the absence of any morbid phenomenon at the seat of pain, are distinguishable from them by having an obvious or assignable eccentric cause, the pain being referred either to the seat of the cause or to some part of the periphery more or less remote from it.

Cases of this kind—some of which exemplify the action of what is commonly called sympathy—often occur. It was, no doubt, their occurrence in the form of reflex actions, originating in enteric disorders, that caused Sir Charles Bell to form the opinion he held concerning the nature and origin of neuralgia.* Swan has related a case in which pains in the fingers were excited by the act of defecation, and another in which pains at the backs of the fingers were felt during the evacuation of the bladder when much distended.† Dr. Downing mentions another, in which the same act produced pains in the hips and legs ;‡ and I have seen several essentially similar cases. The most familiar example of the forms of neuralgia comprised within the group now in question is that produced, often at a considerable distance from itself, by a carious tooth : cases are constantly observable in which violent pain, without any apparent disease, is felt in sound teeth, sometimes near the carious tooth, often in the opposite jaw, sometimes on the same side, and sometimes on the opposite side. In all such cases it is obvious that the real seat of the neuralgia is the nervous centres related to the sensory nerves pri-

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* He says,—"So convinced am I that it is the more direct connexion established betwixt the sympathetic nerve and the fifth that produces this pain [trigeminal neuralgia] that I could wish to divide the sympathetic in the neck, if I thought it could be done with safety, which it cannot."—"The Nervous System of the Human Body," page 350. The cervical sympathetic seems to be a great tempter of eminent neuro-pathologists : I remember hearing Brown-Séquard, when baffled in his treatment of a case of epilepsy *(petit-mal)*, say he was strongly inclined to divide that nerve !

† *Op. cit.*, p. 49. ‡ *Op. cit.*, p. 44.

marily affected, and to those terminating at the point where the pain is referred.

GROUP III. : *Cases presenting Morbid Phenomena of the Voluntary Muscular System.*—These comprise cases like to those forming Groups I. and II., but with the addition of morbid phenomena of the voluntary muscular system, chiefly, but not necessarily, at the seat of pain. These phenomena consist of cramps or tonic spasms, twitches, jerks, and other convulsive movements. In some cases slight twitchings of the facial muscles, as observed by Eulenberg,* prelude the neuralgic paroxysms; and blepharospasm often occurs. Out of 128 cases of trifacial neuralgia analysed by Notta, 52 were found to have manifested convulsive movements on the affected side.† The cases reported at the end of this volume, and numbered respectively 4, 5, 12, 17, 24, 29, 30, 55, 58, 59, 67, 78, and 83 exemplify various forms of these muscular disorders. Dr. Anstie says he has seen "a spasmodic condition of the rectum," spasmodic stricture of the male urethra, and vaginal spasm accompanying neuralgia.‡ In stumps of limbs which have become neuralgic after amputation there is occasionally, as remarked by Dr. Downing, "a turning, writhing, and twisting of the limb, accompanied by intense suffering." He mentions a case at the Charing-Cross Hospital in which "the *stump* seemed to be endowed with the gift of perpetual motion; the only rest consisting in a change, at long intervals, from clonic to tonic spasms of the muscles."§

In the cases constituting this group, disease of the sensory nerve-centre, which may or may not have been originated by an eccentric cause, becomes extended to adjoining motor nerve-cells, and then, by means of the motor nerves connected with them, becomes manifest in disorderly action of voluntary muscles. The great majority of physicians, concurring with that pre-eminent neuro-pathologist, Brown-Séquard, see in these disorderly actions evidence of hyperæmia in the motor-nerve cells functionally related to the affected muscles; they will therefore have no difficulty in recognising that sensory cells in the immediate neighbourhood of hyperæmic motor cells are likely to be in a similar condition. That in such cases of disorderly muscular action the motor cells functionally related to the affected muscles are hyperæmic, is, in my opinion, proved by the fact that the exertion of a sedative influence over those cells causes such disorderly actions to cease.

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* "Lehrbuch der functionellen Nervenkrankheiten auf physiologischer Basis bearbeitet." Berlin: 1871, p. 91.

† "Archives Générales de Médicine," 1854, Vol. II.

‡ "Neuralgia and the Diseases that resemble it," page 107.

§ *Op. cit.*, p. 99.

GROUP IV. : *Cases presenting Morbid Phenomena of the Involuntary Muscular System.*—These comprise a considerable number of remarkable and peculiarly interesting cases. Besides pain and the disorderly muscular actions just mentioned, these cases present some one or more of the several phenomena which I shall now advert to, viz. :—

Pallor and Coldness of the Neuralgic Area.
Anæsthesia of the Neuralgic Area.
Partial Paralysis and Atrophy of the Painful Nerve.
Paralysis of other Nerves, both Cerebral and Spinal.
Amaurosis.
Cataract.
Dilatation of the Pupils.
Enfeeblement and Partial Atrophy of Voluntary Muscles.
Certain Indolent Ulcers, to which the epithet "neuralgic" and "cold" have been applied.
Constipation of the Bowels.
Deficient Menstruation.
Whitening, and Falling off of the Hair.
Arrest of Secretion.

The whole of this extensive group of complications of neuralgia I regard as either wholly, or in great part, products of the constringing energy exerted by the sympathetic ganglia to which the disease affecting the sensory nerve-centre is extended.

Pallor and Coldness of the Neuralgic Area, often notable in sufferers from neuralgia, and often, indeed, extending much beyond that area, arise from the closure, more or less complete, of the peripheral arteries within the affected region.

Anæsthesia of the Neuralgic Area.—When this symptom occurs, it is, in the majority of cases, also due to the same cause—local anæmia : the sensory nerve filaments within the anæmic area, being deprived of their normal amount of blood, are no longer capable of duly perceiving and conveying impressions to the sensory centres, and hence the numbness which is experienced, and which is by no means rare. Notta observed it in three out of 128 cases. According to my experience, the relative frequency of its occurrence is considerably greater than this.

Partial Paralysis and Atrophy of the Painful Nerve which is reported to obtain in some cases is, I apprehend, similarly produced. *Post-mortem* examinations have revealed this phenomenon in several instances ; and, indeed, if the view here expressed be correct, it is evident that this condition must obtain to some extent, differing, of course, widely in degree in different cases, whenever reflex action through vaso-motor nerves occurs

at the seat of pain. This form of neuralgia, associated with vasic spasms, is the one in which the pain, according to Romberg, "seems as if it were the prayer of the nerve for healthy blood"! Notwithstanding the adoption of this ingenious etiological view of the distinguished German by several neuro-pathologists, among whom I may mention Dr. Bland Radcliffe and Dr. Handfield Jones, I cannot help observing, in passing, that if mere local anæmia be the immediate cause of the pain, and therefore of the prayer, it is remarkable that when the fingers of delicate women are said to "die away" owing to the absence of blood in them, the digital nerves offer up no prayer; while, if it is not the absence but the unhealthiness of the blood which impels the nerve to pray, how is it that usually only one nerve at a time out of the large number in the body becomes so dissatisfied with the quality of the blood supplied to it as to betake itself to prayer for a superior kind of vital fluid?

Paralysis of other Nerves, both Cerebral and Spinal.—Neuralgia, involving vaso-motor centres, may, of course, radiate its morbid influence in various directions, and the nature of the resulting phenomena will depend on the character of the organ affected. As already shown, if the disorder be extended to the arteries of the skin it will become pallid and cold; if the painful nerve be within the area of the vasic spasms it may become not only anæsthetic, but atrophied; and, in like manner, paralysis of other nerves may also be associated with neuralgia: paralysis of the motor oculi has been frequently observed in connexion with trigeminal neuralgia. "Marchal de Calvi," says Brown-Séquard, "relates four cases of neuralgia of the fifth pair of nerves which had produced a paralysis of the third pair. * * * Neucourt and M. Gola have each seen one case of facial paralysis cured at the same time that a neuralgia, which had caused it, was cured. Dr. Badin d'Hurtebise has seen a neuralgia of the supra-orbitalis nerve producing a paralysis of the third and sixth pair of nerves, which paralysis ceased quickly after the cure of the neuralgia."* Notta reports that of the thirteen cases collected by him, in which there was closure or spasmodic contraction of the eye-lids, six were cases in which there was falling of the eye-lid, or paralysis of the levator palpabræ. He also reports two cases in which there was paralysis of the facial nerve. It is, of course, impossible to say what may have been the most immediate cause of paralysis in these cases; whether the palsy affected only the nerves themselves, or whether it was produced by a morbid condition of the nerve-centres, and if so, whether that condition was one associated

* "Course of Lectures on the Physiology and Pathology of the Central Nervous System." Philadelphia: 1860. Pp. 164-5.

with anæmia or hyperæmia. But there can be little reasonable doubt, I imagine, that in some of these, and in like cases, at all events, arterial spasms have played an important part as paralysing agents by impairing the nutrition and oxygenation, and therefore the functional power of the nerves in question.

"In a case of reflex paralysis, which I have carefully watched," says Brown-Séquard, "a sprain of *one arm* at the elbow-joint soon produced a *paralysis of both arms*, but more marked in the uninjured arm than in the other. Every change in the degree of pain in the injured elbow was accompanied by a corresponding change in the degree of the paralysis; and up to the time I write these lines, the pain having ceased for several years, the paralysis which ceased with it has not reappeared, and the two arms have as great power as they ever had before the injury." The same author has also collected the reports of several cases of paralysis of the lower extremities, and of hemiplegia, due to peripheric irritation. In one remarkable case, published by Dr. Shearman, hemiplegia of the *right* limbs was accompanied by tic douloureux of the right inferior maxillary nerve. The patient was cured by tonics and galvanism. "In another case, reported by Barron Larrey, a lady was attacked with hemiplegia on the same side where she suffered from a neuralgia, the hemiplegia being more evident during the attacks of neuralgia; both affections were cured by moxas. Sir Astley Cooper mentions the following fact: 'Mr. Toulmin attended a lady on account of her suffering severely from a diseased tooth, and she appeared also to be afflicted with hemiplegia. Mr. Toulmin extracted the tooth, and in a short time the paralytic affection entirely subsided.'"* Notta, as stated by Brown-Séquard, mentions a case in which sciatica produced paralysis of the extensor muscles. The paralysis lasted two months after the cure of the sciatica.

Amaurosis.—In those cases in which this disease is noted as an accompaniment of neuralgia the disorder is, I maintain, likewise referrible most frequently to preternatural vaso-motor nerve energy producing constriction of the several branches of the arteria centralis retinæ, and thus shutting off that full supply of blood necessary for the adequate nourishment and normal function of the visual organ. Notta reports amaurosis to have been present in ten out of the 128 cases of trifacial neuralgia which he analysed: surely an extraordinarily large proportion! Cases are recorded in which the amaurosis increases during the attacks of neuralgia, and decreases when it declines, and, as Brown-Séquard says, "the short

* "Diseases of Nerves." Art. in Holmes's "System of Surgery." Second edition. Vol. IV., pp. 194-5.

duration of this amaurosis, its relapsing character, and, moreover, its appearance during, or immediately after, an attack of neuralgia, and the fact that it was cured when the neuralgia was cured, prove that it resulted from the irritation of the trigeminal nerve."* Indeed, the ophthalmoscope has revealed the fact that in a very large proportion of the cases of this disease its proximate cause consists of chronic spasm of the arteries of the retina, with the inevitable consequence—arrest of nutrition and corresponding loss of function of that important structure.† In his excellent monograph on Diseases of the Nerves already referred to, Brown-Séquard has collected some evidence on this point. He says :—"Dr. Noyes, of New York, has lately examined with the ophthalmoscope the retina of a patient (a medical man), who, after a blow on his forehead, had become amaurotic. The only alteration observed was a diminution of size of the central artery of the retina. In an important case recorded by Mr. J. Hutchinson, the two eyes became amaurotic, in consequence of an injury to the supra-orbital nerve of one side. The ophthalmoscope showed that the retina and optic nerves were atrophied. The accident had taken place ten years before this examination." Professor Carion, of Vienna, who adverts to the kind of amaurosis in question under the appropriate name—*anæsthesia optica*, refers to the opinion of Graefe and Secondi that it is explicable as a phenomenon of vaso-motor disturbance, and he says,—"The circumstance that, sometimes by division of the trunk of the frontal nerve, or by removal of the affected tooth, a cure of the impaired vision is effected, is favourable to the view of a simple anæsthesia."‡ Dr. Hübsch, of Constantinople, says he has seen three cases of amaurosis occurring in pregnant women, and disappearing after

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* "Course of Lectures on the Physiology and Pathology of the Central Nervous System." Philadelphia : 1860. Page 157.

† See a very valuable contribution to our knowledge of this subject by Jonathan Hutchinson, F.R.C.S., entitled "Clinical Data respecting Cerebral Amaurosis, more especially with reference to that form supposed to be connected with the use of Tobacco." The paper forms part of "Clinical Lectures and Reports," by the Medical and Surgical Staff of the London Hospital, Vol. I., 1864. Mr. Hutchinson mentions that in the cases of what he calls "Amaurosis *par excellence*, very often there is more or less giddiness," and that an "excessive tendency to sleep" is "one of those symptoms most frequently present" (p. 35). The significance of these symptoms, and especially of the excessive tendency to sleep, as evidence that the vaso-motor nerve centres related to the brain-arteries are excessively energetic, will be duly appreciated by all who know both the function of those centres, and the proximate cause of sleep.

‡ "Treatise on the Diseases of the Eye, including the Anatomy of that Organ." Translated by Drs. C. E. Hackley and D. B. St. John Roosa, of New York. London : 1868. P. 652.

delivery.* These were undoubtedly cases of spasm of the retinal arteries—spasm, the genesis of which is identical with that of the cerebral arteries when productive of the cerebral anæmia, and "fainting fits," which are frequent concomitants of pregnancy. Dr. Dickson, also of Constantinople, was an eye-witness of the production of amaurosis by violent mental emotion in a military officer while he was being solemnly cursed by a venerable old Sheik, from whom he exacted tribute. It is, of course, dubious whether in this astonishing case the immediate cause of the blindness consisted of violent spasm of the arteria centralis retinæ, or of grave cerebral injury at the origin of the optic nerves: it may have consisted of both.†

Cataract.—There are good reasons for believing that cataract is often, at least, a result of anæmia of the lens. "Cataract is often observed in both eyes of persons who suffer from diabetes mellitus, or who have taken secale cornutum for a prolonged period, and not unfrequently in females during suckling;" and "senile cataract is attributed to impaired nutrition of the fibres of the lens."‡ Indeed, Professor Carion says emphatically,—"Cataract and atrophy of the lens are synonymous expressions. In the lens, as in other organs, atrophy sometimes occurs from diminution or change of nutrition."§ Referring to ergotism as a cause of cataract, he observes,—"It is not yet decided whether the poison, by its specific action on the ciliary system, impairs the nutrition of the crystaline, *or if the cramps, which form the chief symptom of the disease, produce the cataract mechanically.*"‖ If it should be ascertained that the "cramps" really do "produce the cataract mechanically" by lessening its nutrition, and it seems very probable that they do, the fact would afford a striking confirmation of the general doctrine here insisted on. But in any event the considerations already adduced, and the general tenour of Professor Carion's exhaustive remarks on the causes¶ of cataract, thoroughly justify the inference that some of those cases of *cataract brought on by neuralgia* are results of a reflex influence originating in the irritated branch of the fifth nerve,

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* "The Ophthalmoscope: its Varieties and its Use." Translated from the German of Dr. A. Zander by R. B. Carter, F.R.C.S. London: 1864. P. 221.

† *Ibid*, pp. 221-2. The curse was as follows: "Since you insist on carrying out your evil design upon the funds of the poor, may the Almighty curse you with blindness!" and "these words were hardly uttered when I observed (for I was present)," says Dr. Dickson, "Hadj-Goónus suddenly place his hand on his head, and moan aloud from the intense pain he felt there. This was not all—for he had become totally blind." He died a short time afterwards.

‡ "The Natural and Morbid Changes of the Human Eye, and their Treatment." By Charles Bader. London: 1868. Pp. 277-8.

§ *Op. cit.*, p. 496. ‖ *Ibid*, p. 515.

¶ *Ibid*, p. 514, *et seq.*

and transmitted along the vaso-motor nerve of the arterial vessels supplying the media from which the lens is nourished by transfusion.

Dilatation of the Pupil, when of an active character, proceeds, as is well known, from stimulus of sympathetic nerve fibres, which originates in the "cilio-spinal region."

Enfeeblement and partial Atrophy of Voluntary Muscles.—The theory here insisted on requires the presence of this disorder as an occasional complication of neuralgia, and it has been many times observed. Brown-Séquard states that his "friend and pupil, Dr. Clement Bonnefin, has seen nineteen cases of muscular atrophy caused by a neuralgia. A remarkable fact observed in those cases serves to explain how the atrophy was produced: there was a marked diminution of temperature, most likely due to a spasm of blood-vessels. The amount of blood was consequently diminished, and the wasting occurred owing to the lack of nutritive fluid."* In seven of Notta's cases of trifacial neuralgia a more or less extensive atrophy was observed; and Brown-Séquard, referring to these cases, remarks: "I have seen two cases—one of sciatica, having produced an atrophy of some of the muscles of the leg; the other, in which pain starting from the cicatrix of a wound on the *left* forearm has caused atrophy of *both arms*."† Sir James Paget says, "rapid wasting of muscles in certain cases of sciatica—chiefly, I think, in such as depend on sciatic neuritis—and the cessation of the pain is commonly followed by renewed growth of the muscles, as rapid as was their wasting." He also says,—"Dr. Bauer‡ has pointed out that the wasting of the limb, in very painful disease of the hip-joint, is much greater and more rapid than in mere inaction, and, referring it to a reflected nervous influence, has related an illustrative case in which pain in, and contraction and wasting of, the muscles of the calf followed a stab in the back near the spine."§ In a case of double sciatica, under my care, the muscles of both limbs were so generally and so thoroughly wasted that complete paralysis ensued, and the patient was unable to leave her bed. As a proof that the wasting was mainly effected by vaso-motor agency (excessive energy of vaso-motor nerve centres), I may mention that the circumference around the calves increased to the extent of three quarters of an inch in the course of about a month, during which that vaso-motor force was steadily lessened by the systematic application of ice every day

* Art. on "Diseases of Nerves" in Holmes's "System of Surgery." Second edition. Vol. IV., p. 201.

† "Course of Lectures on the Physiology and Pathology of the Central Nervous System." Philadelphia: 1860. Page 163.

‡ "On Hip Disease." New York: 1859.

§ "Lectures on Surgical Pathology." Third edition. P. 93.

along the dorso-lumbar region. Case 67, given at the end of this volume, is also a remarkable example both of general emaciation, associated with general neuralgia, and of rapid nutrition and growth again while the energy of nervous centres was being vigorously repressed by means of the Spinal Ice-bag. I may add that I have already published* a case of extensive muscular atrophy involving the face, neck, thorax, and upper extremity, in which the disease originated in intense and prolonged pain in one hand, caused by a fall, which forced the fingers violently backwards.

Neuralgic Ulcers.—"The type of ulcers whose pain having no satisfactorily proved cause may be called neuralgic, is," says Sir James Paget, "in those small flat, oval, or circular ulcers that occur at the margin of the anus—the so-called irritable ulcers or fissures of the anus. These show well how very little power any sedatives, locally applied, have to subdue the pain of ulcers. The only remedy is in the cure of the ulcers, whether by section for those at the anus, or by whatever means might be required for ulcers of the same kind not attended by unusual pain. Nitrate of silver, for example, will do more to assuage a neuralgic eczematous ulcer than any opiate application. It is, indeed, remarkable that when such ulcers are brought to healthy granulation they are scarcely painful, and their scars are not more sensitive than those of any other form."† There can be little doubt that in cases of this kind the seat of the ulcer is decidedly anæmic, owing to spasms of the blood-vessels caused by centric nervous disorder. This conclusion is confirmed by the fact that nitrate of silver, which increases the afflux of blood at the seat of disease, proves peculiarly efficacious, whereas opium, which exercises a contrary influence, is found to be useless.

Cold Ulcers, as Sir James Paget appropriately calls them,‡ occurring spontaneously in the extremities, are often, I believe, associated with a neuralgic diathesis. A patient of mine who suffered exceedingly from uterine neuralgia was troubled with a large cold ulcer on the anterior part of the leg. She was a victim of extreme dysmenorrhœa; her menstrual periods recurred only about every six weeks; the menses were extremely scanty, and during each period she suffered excruciating pain, accompanied with vomiting at frequent intervals for at least twenty-four hours. Her bowels were obstinately constipated, and her lower extremities were habitually and almost deathly cold. In that case the

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* In the *Medical Press and Circular*, May 1, 1867.

† Art. "Ulcers," by Sir James Paget, contributed to "A System of Surgery," edited by T. Holmes. First edition. Vol. I., p. 216.

‡ *Ibid*, p. 201.

extreme periodic pain was clearly associated with abiding vasic spasms, either reflected from the womb, or originating centrically in common with the uterine disorder. In either case the permanent seat of the malady which simultaneously affected the womb, bowels, and lower extremities was most certainly seated in the nervous centres, presiding over these different organs, as the results of treatment decisively demonstrated.

Constipation of the Bowels.—I have good reasons for believing that this troublesome disorder which accompanies many cases of neuralgia, is due to morbid constriction of the intestinal arteries, and thus, both the mucous membrane and the muscular coat of the intestines being deprived of their wonted quantity of blood, are likely to function inadequately; and if they do, the consequence may be deficient secretion of intestinal mucus, and will almost surely be such enfeeblement of the vermicular muscles as to prevent them from forcing the fœces along the intestinal tube with that regularity and rapidity which obtain in healthy persons.

Deficient Menstruation.—In hundreds of cases I have proved by experiment that this is caused by excessive vaso-motor energy expended on the uterine arteries.

Whitening, and Falling off of the Hair are, in all probability, effects of excessive excitement of the sympathetic centres controlling the arteries of the scalp. The very remarkable and well-authenticated cases of persons whose hair has become suddenly grey, or has rapidly fallen off, are, as a rule, cases in which violent mental emotion has been experienced; and such emotion very frequently produces immense tumult in the vaso-motor nerve centres—a condition denoted by the extreme pallor observable in such cases. And that the condition of the sympathetic centres in cases of "nervous headache" is like to that which obtains in cases of trigeminal neuralgia I have no doubt. The following instructive case is recorded by Sir James Paget:—"A lady, who is subject to attacks of what are called nervous headaches, always finds in the morning, after such an one, that some patches of her hair are white as if powdered with starch. The change is effected in a night, and, in a few days after, the hairs gradually regain their dark brownish colour."* In three of Notta's 128 cases of trigeminal neuralgia the hair fell off. Dr. Anstie relates a similar experience as a result of supra-orbital neuralgia: the hair of the corresponding eyebrow, and also of a part of the scalp of the same side, became during an attack either white or grey. On each occasion the loss of colour continued several days, and then gradually the normal colour returned. This experience seems to me strikingly accordant with the idea that the loss of colour was

* "Lectures on Surgical Pathology." Third edition. 1870. P. 31.

due to vaso-motor action. Eulenberg,* who cites Dr. Anstie's case, mentions two others: one of a woman who, after having a sudden attack—lasting only a few minutes—of acute pain in the face during the night, found on the following morning that the inner half of the eyebrow and the corresponding part of the eyelashes had become completely white;† the other was that of a governess treated by Eulenberg himself. She had suffered from violent attacks of supra-orbital neuralgia on the right side for a long time, and her right eyebrow and a strip of hair on the same side turned as white as snow. Every fact connected with these cases confirms the supposition that the loss of colour was a purely vaso-motor phenomenon.

Arrest of Secretion.—In the few cases of neuralgia in which the fundamental disturbances of glands are manifested by an arrest of secretion, as, for example, in the case reported by Notta in which the nasal secretion was suppressed, the phenomenon is, in my opinion, due, not to an enfeeblement or paralysis of the positive motor nerve, but to extraordinarily vehement action of the negative motor nerve which, constringing the gland artery even to closure, completely shuts off from the gland its supply of blood out of which alone it can elaborate its peculiar secretion.

The proximate cause of the group of phenomena just mentioned, dilatation of the pupil excepted, consists, as is manifest from the foregoing exposition, in privation of blood in the structures in which they occur, that privation being itself an expression of excessive force in the ganglionic centres functionally related to the arteries of those structures. I have therefore adopted what seems to me a distinctly expressive term by which to denote the character of that force, viz., *Negative Motor*. The value and convenience of this term will, I think, become apparent when I advert to the other complications which still remain to be discussed. I have only to add here that in respect to several of the negative phenomena just explained, I am able to adduce decisive proofs that the explanation given is the correct one.

GROUP V.: *Cases presenting Morbid Phenomena of the Glandular System.*—These comprise cases which may present any of the phenomena characteristic of each of the preceding groups, but which are also distinguished by symptoms of excessive secretion, the glands or glandular surfaces which are functioning excessively being generally seated within or near the region of pain. Asso-

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* *Op. cit.*, p. 99.

† Quoted from the *Lancet* for March 6, 1869.

ciated with different cases of neuralgia, one or more of the following disorders may, from time to time, be observed :—

Lachrymation.
Rhinorrhœa.
Ptyalism.
Bronchorrhœa.
Nervous Flatulence.*
Diarrhœa.
Excessive Secretion of Urine.
Seminal Emissions.
Leucorrhœa.
Unilateral Sweating, or Sweating over Circumscribed Areas.

In those cases in which any of these symptoms are observable, the disease of the sensory nerve-centre is extended to the nerve cells of nerves presiding over glandular action, and as the disease consists in hyperæmia and excessive nutrition of those cells, the glands influenced by them may easily be supposed to function with morbidly excessive vigour. But in order to make thoroughly clear that part of my theory of neuralgia which relates to the glandular disturbances often accompanying the disease, I find it needful to premise a few words concerning the *rôle* of the nervous system in the process of secretion.

The Innervation of Glands.—In 1864 I definitely ascertained that perspiration and secretion of bronchial mucus may be produced by the application of heat along the spine, and that both may be arrested or lessened by the application of cold along the same part; and I have also ascertained that nausea, vomiting, and diarrhœa (involving excessive action of the enteric mucous membrane) may be produced by heat and may be annulled by cold applied along the spine. Now, if this be so, it is plain not only that glands are impelled to act by nervous influence, but also that they must be innervated by nerves quite independently of those which are distributed to their blood-vessels; and, in fact, Professor Claude Bernard has proved that the submaxillary and parotid glands are each supplied with a special motor nerve, emanating from the cerebro-spinal system, as well as with the branches of the sympathetic supplied to the arteries of the glands. He has also proved that when the cerebro-spinal nerve is excited the gland becomes active, that the amount of blood which then passes through the gland is greatly increased, that the colour of the blood flowing through the glandular vein becomes red, and that the amount of saliva secreted is proportionate to the irritation of the cerebro-spinal nerve; also, that if the branches of the sympathetic nerve distributed to the gland be irritated, the supply of blood to it is almost wholly cut off, that the salivary secretion is arrested, and finally, that when the same branches are divided, the supply of blood to the gland and

* The genesis of this product of the gastro-intestinal mucous membrane will be adverted to in the section on the pathology of enteralgia.

the secretion of saliva become copious. The special motor nerve of the submaxillary gland is the chorda tympani; that of the parotid gland consists of a branch or branches from the auriculo-temporal nerve. Thus it appears that these two glands, at all events, are poised between two forces, the one cerebro-spinal, the other sympathetic, and, arguing analogically, we may reasonably conclude that a like method of innervation obtains in respect to all other glands and glandular surfaces throughout the body. And this conclusion is confirmed, not merely by the facts I have verified in respect to the bronchial and enteric mucous membrane and the sweat glands, but also by a large number of other facts scattered throughout medical records.

The Modus-operandi of Secretory Nerves.—The question how, in the case of the submaxillary gland, for example, does the cerebro-spinal nerve promote the secretion of saliva? is a very interesting one, and has an important bearing on the subject of this chapter. Bernard seems to believe that the gland will secrete saliva if only it be supplied with blood, and expresses the opinion that the function of the chorda-tympani nerve is to neutralise or disable, by a sort of paralysis, the branches of the sympathetic supplied to the arteries of the gland, so that when saliva is needed they are enabled to dilate, and thus to allow a maximum amount of blood to pass through them to the gland. Ever since my attention has been directed to this subject, I have been accustomed to consider that the gland textures are under the immediate stimulating influence of the nerves distributed to them—that, in fact, the constituent elements of the glands are endowed with the power of attracting the blood they require, from which to elaborate their secretions, by being placed and sustained in a certain electric state through the agency of the nerves distributed to them. And I was much gratified by learning in 1866 that my views on this subject were completely confirmed by the laborious microscopical investigations of Pflüger, who found that the filaments of the chorda-tympani nerve are distributed to the cells of the submaxillary gland, and not only so, but that their several terminations are actually in the nuclei of the cells.* This important discovery seems to have been fully confirmed by Boll;† and Letzerich's investigations respecting the modes of termination of the nerves in the testicle "would seem to show," as Sir James Paget remarks, "that the minute nerve-fibres in these various glands pierce the membrana propria of the acini and tubes, and come into close relation with the secreting cells."‡ Moreover, Lipman has demonstrated the direct ending of nerves in the

* "Die Endigungen der Absonderungsnerven in den Speicheldrüsen." Von Dr. A. F. W. Pflüger. Bonn: 1866.

† Schultze's "Archiv.," IV., p. 146, cited by Sir James Paget.

‡ "Lectures on Surgical Pathology." Third edition. P. 31.

nucleoli of the corpuscles of the cornea, and in its posterior epithelial cells.*

The Positive Motor Nerve Force.—The cerebro-spinal nerve supplying each gland with the positive force, by virtue of which it functions, I distinguish from the vaso-motor nerve, also distributed to the gland, but ramifying on its arteries only, by the name *positive motor*, for it seems to me that this name, along with its corresponding one—*negative motor*, serves to supply a pressing need, viz., that of describing within the compass of a brief phrase, the twofold nature of glandular innervation. Whether these names will be ultimately adopted by the profession when the functions they respectively designate are generally understood, or whether they will be superseded by better ones, remains to be seen; but, meanwhile, they are certainly useful in giving clearness and precision to our expressions, not only concerning the innervation of glands, but also, as we shall presently see, concerning the forces effecting and controlling the processes of textural nutrition throughout the body.

The Proximate Cause of Excessive Secretion.—It is plain, I think, from this exposition that in all cases of excessive glandular activity associated with neuralgia, the nerve-cells at the root of the positive motor nerve, distributed to the gland in question, are unduly energetic, and therefore in that state of hyperæmia predicated of the roots of the several classes of nerves already shown to be in a state of preternatural vigour in certain cases of neuralgia. And that such is the case I am thoroughly assured by numerous experiments which prove conclusively that, while the stimulant influence of heat applied to the centres in question will, as a general rule, increase secretion, the sedative influence of cold, similarly applied, will lessen it.

Examples of Excessive Secretion.—The profuse secretion of saliva by children during teething is a forcible, as well as an ever recurring, example of morbidly excessive activity of glands originating in excitement of sensory nerves: irritation proceeding from the gums, through the extremely sensitive structure of which the young teeth are pushing themselves, is conveyed to the medulla oblongata, and is thence reflected through a branch of the auriculo-temporal and through the chorda tympani (both of which are motor) on to the salivary glands, which hence secrete super-abundantly. In the same way, any eccentric or centric cause of neuralgia propagating its influence to nerve-cells related to glands produce a like effect:

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* "Ueber die Endigung der Nerven in eigentlichen Gewebe und in hinteren Epithel der Hornhaut des Frosches," Virchow's "Archiv.," 48 (1869), quoted by Eulenberg, *op. cit.*, p. 95.

indeed, it must be obvious to every thoughtful person who duly considers the data here adduced, that if the pathology of neuralgia which I have thus far explained be correctly founded, evidence of excessive glandular action must inevitably present itself in a certain proportion of cases; and certainly experience proves that the requisitions of the theory are completely complied with. Shedding of tears is the most frequent phenomenon of this kind, probably because neuralgia occurs most frequently as an affection of the trifacial nerve. Lachrymation occurred in 61 out of the 128 cases reported by Notta. In many cases the secretion of nasal mucus is notably increased: in 10 of Notta's cases it was increased on the affected side. A copious flow of saliva is also often observable: it occurred in 14 of Notta's cases. In a certain class of so-called "highly nervous" persons, peculiarly liable to neuralgic affections, powerful and sudden impressions on the senses, producing vivid and vehement emotions, are reflected on to glandular organs, and burst forth not only as tears in cases of great grief or joy, but as a profuse diarrhœal flux, which denotes excessive activity of the liver, pancreas, and the vast glandular (mucous) membrane of the alimentary tract. When the spinal cord is tumultuously excited during prolonged fits of "hysteria" and epilepsy, the renal glands are powerfully stimulated, and thus made to pour out an excessive abundance of urine; and the epileptic paroxysm not infrequently induces an emission of semen. Both the renal and seminal glands are notably affected by mental states, and the influence of mental emotion on the sweat glands, causing persons to be bathed in sudden sweat, is known to everyone. Now we have seen, on the one hand, how any gland or glandular surface within the region of neuralgia may be impelled to act with preternatural energy, and, on the other, how every gland or glandular surface may be forced into sudden and vehement activity by vehement emotion; and thus, even without the aid of anatomical knowledge, we obtain evidence that secretion is due to an afflux into the gland of nervous energy, originated in the nervous centres by influences which take their rise in impressions made on the ordinary sensory nerves, in impressions on one or more of the special senses, or in imagination either revivifying former experiences or creating new scenes, the contemplation of which reacts on, and *excites*, some part of the bodily organism.

GROUP VI.: *Cases presenting Phenomena of Local Inflammation.*—These comprise those cases of neuralgia distinguished by the presence of complications which have been appropriately designated "trophic phenomena." The main feature of these complications—the last of those to which I shall advert—is local

inflammation which presents itself in various shapes, the peculiarity of the phenomenon in each case being dependent on the special character of the structure in which it appears. As examples of these complications I may mention,—

Inflammation, Hypertrophy, and *Points douloureux*, of the affected nerve.
Inflammation and Hypertrophy of the Neuralgic Area.
Hyperæmic and Inflammatory Diseases of the Eye.
Inflammation of the Ear.
Inflammatory Disorders of the Skin.
Hypertrophy of the Hair.
Exostoses, and other morbid Developments of Bone.
Tumours.
Anæsthesia or Paralysis associated with Swelling at the Seat of Pain.

Trophic Nerves: Evidence of their Existence.—That the transformative processes constituting the elemental assimilation and disintegration—the nutrition and decay of every part of the human organism—are effected by virtue of animating and selective force derived from the nervous system, is a proposition which is becoming more and more thoroughly established by every increment of physiological and pathological knowledge which careful and competent observers are continuously adding to the great store already accumulated; and it seems to me that the exact knowledge we now possess concerning the mode of innervation of the salivary glands, and the justifiable conclusion that all secreting organs are innervated in the same manner as they are, furnish us with a reliable indication how we may unveil the mystery of textural change, whether of a normal or of a morbid kind.* As the orderly motion of the planets is a condition of equilibrium between two opposing forces, so the healthy life of the elemental structures of the higher organisms, at all events, appears to be a process resulting from the continuous action of two opposing forces, which balance each other; but anæmia and atrophy on the one side, and hyperæmia, hypertrophy, and inflammation on the other, are consequences of a predominance of one of these forces —consequences, in short, of a perturbation of the orderly transformative movements of the organic structures.† It will thus be

* "The process of secretion is so essentially similar to that of nutrition, that whatever can be proved of the method of one, might be inferred for that of the other."—"Lectures on Surgical Pathology," by Sir James Paget. Third edition, pp. 30-1.

† "It is almost inconceivable that any of the essential properties of a secretion should be changed by an alteration in the quantity or movement of blood in a gland: yet such changes are frequently manifest in the milk, tears, urine, and sweat, under the influence of mental affections of the

seen that I look upon the force, now well known to be transmitted along the vaso-motor or negative motor nerves accompanying every artery in the body, as balanced by what I have called positive motor nerves—nerves, the structural relation of which is recognised anatomically in respect to certain glands, and the existence of which in relation, not only to all other glands, but to all other bodily structures, may be regarded as established both by valid arguments from analogy, and by a large number of well authenticated physiological facts.

Sir James Paget has collected many facts of this kind. A cord was drawn very tight round a man's wrist: at that time "it is probable the median and other nerves suffered injury; for he had constant pain in the hand after the accident, impairment of the touch, contraction of the fingers, and constantly repeated ulcerations at the back of the hand." In a case, under the care of Mr. Hilton, of fracture of the lower end of the radius, its repair was accompanied by the formation of an excessive quantity of new bone, which caused compression of the median nerve: the patient "had ulceration of the thumb and fore and middle fingers, which resisted various treatment, and was cured only by so binding the wrist, that the parts on the palmar aspects being relaxed, the pressure on the nerve was removed. . . . Mr. Travers mentions a case in which a man had paraplegia after fracture of the lumbar vertebræ. He fractured, at the same time, his humerus and his tibia. The former in due time united; the latter did not. Mr. De Morgan has related a similar case. A man fractured his twelfth dorsal vertebra, and crushed the cord; dislocated his left humerus, and fractured fourteen ribs and his left ankle. He lived eighteen days, during which the reparative process was active at the injuries above the damage of the cord, but seemed to be wholly wanting at those below it." Paralysed parts have only a slight power of resisting the influence of heat; sloughing often occurs after injury of the spinal cord; and the repair or reproduction of parts, the nerves of which are paralysed or divided, is remarkably slow. These facts, which have been often witnessed and recorded by competent observers, "contribute to prove," as Sir James Paget justly remarks, "that the integrity of the nervous centres and trunks, which are in anatomical relation with a part, is essential to its due nutrition or to its capacity of maintaining itself against the influence of external forces. But it should be remembered, as

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nervous force; and the analogies of secretion and nutrition give these cases nearly the weight of proof in the question of the influence of the disturbed nervous force in causing inflammations."—"Lectures on Surgical Pathology," by Sir James Paget. Third edition, p. 335.

has, indeed, been explained by Brown-Séquard, that it is disturbance, not mere defect of nerve force, which induces morbid nutrition. When there is cessation of action in a part, as after section of a nerve, slow and simple atrophy takes place."

I quite concur in the opinion here expressed that it is *disturbance* of nerve force which induces morbid nutrition; I am far, however, from believing—as seems to be implied in the sentence last quoted—that simultaneously with the disturbance there is any "defect" of that force; but, on the contrary, I maintain that the chief and characteristic feature of the disturbance is *excessively energetic action* of those "nutrient," "trophic," or "positive motor" nerves which, as alleged, render the various tissues of the body elective of those special elements of the blood that are requisite for their appropriate nourishment and functions.*

The Proximate Cause of Local Inflammation.—It is to the excessive action of these positive motor nerves that I refer all the so-called trophic phenomena constituting the group of neuralgic complications now in question; and, of course, as in the other cases already adverted to, I affirm that the proximate cause of such excessive action consists in hyperæmia or excessive nutrition of the cell-roots of those nerves—a morbid state either propagated by extension to them of the disorder primarily affecting the sensory centre of the algic nerve, or originating simultaneously with that disorder from a common source.

It is now well known that excessive afflux of blood in any peripheral part, produced by paralysing the vaso-motor nerves of that part, may be continued for months without resulting in any morbid phenomenon beyond that of mere hyperæmia; while, on the other hand, there exist authentic records of a large number of pathological facts proving that irritation of cerebro-spinal nerves is followed by grave disorders of the nutritive processes in the parts to which the affected nerves are distributed.

Inflammation, Hypertrophy, and Points douloureux of the Affected Nerve.—It may be stated as a rule that the angles of reflection of sensory impressions are generally very acute, though the exceptions to this rule are numerous. Now, when impressions are reflected at angles, having the maximum degree of acuteness, they pinge, of course, either on, or extremely close to, the points where those impressions were pri-

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* Indeed, considering the general tenour of Brown-Séquard's writings, and of Sir James Paget's remarks on the *rôle* of the nervous system in the process of nutrition, I incline to think that, notwithstanding the expression quoted in the text, both of them hold a doctrine respecting the proximate cause of morbid nutrition substantially the same as the one which I advocate.

marily received; and in the case of centric disorder of sensory nerve-centres without an eccentric cause, but with pain referred to any part of the periphery, the disorder being extended to immediately contiguous motor nerve-centres, will probably be also transmitted to the region of the referred pain. When the influence thus transmitted passes through positive motor nerves along a line parallel, or nearly so, with that traversed by the sensory nerves in question, the nutritive processes of that nerve will be intensified, the nerve will become hyperæmic, perhaps appreciably enlarged, in some cases distinctly inflamed; and, inasmuch as its functional power becomes morbidly exalted to a degree corresponding with the unwonted afflux of blood which the excessively irritated nerves have drawn to it, it becomes so extremely tender and susceptible, that the slightest touch on the affected region is almost intolerable, and even a draught of cold air upon it is sometimes sufficient either to heighten a neuralgic paroxysm, or to induce a fresh one. In such cases the points at which the affected nerve becomes superficial cannot fail to be excruciatingly tender, and hence have received the expressive name—*points douloureux*. In this way I explain the genesis of neuritis when accompanying neuralgia; if the explanation be correct, it is obvious that this phenomenon, as well as that of the *points douloureux*, though not an essential, is a cognate element of the disease, and that the attempts at a differential diagnosis between neuritis, when not traumatic, and neuralgia, are at once unscientific and futile. Valleix says,—"It is evident that we cannot consider hypertrophy perhaps more apparent than real [of the affected nerve] as an important anatomical lesion, seeing that in other cases we meet with atrophy of the same organ, and in others a perfect resemblance between the diseased and the healthy side" (p. 133); but we now see that each of these opposite conditions has important significance and pathological relations, denoting as they do most clearly morbid states of distinctly different nervous centres. Of course the whole tenor of my observations implies that I am no more disposed to believe that the pain of an inflamed nerve is its "prayer" to be delivered of its excess of unhealthy blood, than I am to believe that the pain of an anæmic nerve is its prayer for healthy blood.

Inflammation and Hypertrophy of the Neuralgic Area.—When the disease is radiated from the morbidly affected nervous centres along positive motor nerves at angles of varying acuteness, of course the region over which the nutritive processes become excessively energetic is proportionately great, and hence diffused hyperæmia, swelling, heat, and, it may be, inflammation occur.

Brown-Séquard mentions a case of a young woman in which "swelling and infiltration of the cheek, and complete paralysis

of the facial nerve," came on in consequence of neuralgia of the infra-orbital nerve. The malady also comprised a partial anæsthesia of the face, which, as a symptom associated with swelling, I shall advert to hereafter. According to the authority of Barras and Marotte, referred to by Brown-Séquard, inflammation of the testicle has been several times observed to have been "due to ilio-scrotal neuralgia."*

Sir Benjamin Brodie gives a remarkable case illustrative of the great extent to which the nutritive processes may be increased as a reflex influence from a neuralgic affection of the nervous centres related to the lower extremities. "A lady laboured under an inflammation of her leg. The whole leg was swollen from the toes to the knee, the skin being red, painful, and tender. These symptoms had existed for several weeks; the usual remedies had been employed, and no amendment had taken place; yet the inflammation did not proceed further, and there were no signs of suppuration. At last I observed that the symptoms varied considerably; that sometimes the redness, pain, and swelling had nearly subsided; that at other times they were as strongly marked as ever; and that these variations always took place on the alternate days." Quinine was given: its effect was immediate, "and a few days completed the cure."† Those morbid affections of joints which Sir Benjamin Brodie signalised as hysterical receive their full explanation by means of the hypothesis now propounded. His description is as follows:—"At first there is pain referred to the hip or knee, or some other joint without any evident tumefaction; the pain soon becomes very severe, and by degrees a puffy swelling takes place, in consequence of some degree of serous effusion into the cells of the cellular tissue. The swelling is diffused, and in most instances trifling; but it varies in degree; and I have known, when the pain has been referred to the hip, the whole of the limb to be visibly enlarged from the crista of the ilium to the knee. There is always exceeding tenderness, . . . and *in all cases the symptoms are kept up and aggravated by being made the subject of constant attention and anxiety.*"‡ These words which I put in italics are peculiarly instructive, and are at once fully confirmed and explained by the doctrine which, throughout this chapter, I have striven to enforce—viz., that in all cases neuralgia and its complications imply a morbid state of some part of the cerebro-spinal axis, and especially of the part related to the region

* "Lectures on the Physiology and Pathology of the Central Nervous System." Philadelphia: 1860. P. 162.

† "Lectures Illustrative of Certain Local Nervous Affections." London: 1837. P. 31.

‡ "Diseases of the Joints," third edition, p. 302.

of pain. If we recognize that the essential seat of the malady is always centric, we can readily understand how it may be "kept up and aggravated by being made the subject of constant attention and anxiety."

In December, 1867, I had under my care a very interesting case of neuralgia affecting the forehead and right eye, and accompanied during each attack by very considerable swelling along the middle of the forehead, by free lachrymation on the right side, and—what is peculiarly interesting—very marked sinking of the right eye, the left one being also, though less, affected. So that this case presented an instructive illustration of reflex action in four directions at once (for the malady originated, I have no doubt, in uterine disorder): first, sensory nerve-cells related to the upper division of the fifth pair were hyperæmic, and thus induced a pain referred to the forehead; second, nerve-cells related to a centrifugal gland nerve were hyperæmic, and by causing excessive action of the gland, produced a copious flow of tears; third, nerve-cells related to the centrifugal nerves presiding over the nutritive processes in the frontal region, were hyperæmic, and by causing those processes to become excessive, produced the swelling in question; fourth, the sympathetic centres presiding over the blood-vessels of the eye were also hyperæmic, and therefore, by their unduly energetic action caused those blood-vessels to become excessively contracted, and thus to lessen the volume of the contents of the orbit.

In proof of the marvellous power of feeling and imagination over the bodily functions, and as illustrative both of Sir B. Brodie's statement, and of the general doctrine here advocated, I shall quote here the reports of two remarkable cases mentioned in a pamphlet* which I published some years ago.

"A lady observing a child in whom she was particularly interested coming through an iron gate, feared that when he let the gate go after opening it, it would close upon him and crush his ankle. It was impossible for her to be quick enough, either by act or word, to avert the danger, and she found that she could not move on account of the intense pain which suddenly came on in the ankle corresponding to the boy's which she believed would be crushed. She is sure she did not move so as to strain or sprain it. She walked home with great difficulty, and found her ankle discoloured all round as if painted with red currant juice, with a large patch of the same on the outer part. The next morning the whole foot was inflamed, and she was a prisoner to her bed for many days. The boy was not hurt."†

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* "Christian Revivals: their History, and Natural History." Reprinted from the *Westminster Review* for 1860. London: Trübner and Co.

† "Manual of Psychological Medicine," by Drs. Bucknell and Tuke, page 165, cited in Carpenter's "Human Physiology."

"A lady saw a heavy window-sash fall upon her little child's hand, and was so terrified and distressed as to be unable to render it any assistance. The surgeon who dressed the wound found the mother 'moaning and complaining of pain in her hand.' On examination, three fingers, corresponding to those injured in the child, were discovered to be swollen and inflamed, although they ailed nothing prior to the accident. In four-and-twenty hours incisions were made in them, and pus was evacuated. Sloughs were afterwards discharged, and the wounds ultimately healed." *

Hyperæmic and Inflammatory Diseases of the Eye, in connection with Trigeminal Neuralgia, is a subject so important and so interesting, that I shall venture to devote two or three pages to its discussion.

Redness of the Conjunctiva is the most frequent accompaniment of neuralgia of the fifth nerve: according to Notta, out of 128 cases this symptom was observed *thirty-four* times. In most of these cases the painful nerve was the supra-orbitalis.

Photophobia is also of frequent occurrence: it existed in *eighteen* of Notta's cases. As it is one of those symptoms that cannot fail to arrest the attention of the observer, it is mentioned by almost every writer on trigeminal neuralgia.

Iritis is mentioned by Dr. Anstie as a complication of trigeminal neuralgia, and he maintains that all, or nearly all, the cases of so-called rheumatic iritis are really of a neuralgic nature.

Ophthalmia sometimes occurs, and often when it does so it, like the amaurosis, which is an occasional accompaniment of trigeminal neuralgia, is of an intermittent character.

That these several grades of ocular hyperæmia, the highest of which merges into inflammation, generally originate in excitement of *positive* motor nerve-cells is evident, as it seems to me, from the whole bearing of the facts already mentioned in connexion with the group of disorders here adverted to. That they are phenomena of reflex action originating in excitement of some part of the sensory division of the trigeminus, and thence extended to the trophic nerve-centres functionally related to the eye, will become still more evident if they are considered in connexion with what will be said hereafter concerning ulceration of the cornea and glaucoma. In proof that these complications are, at all events, products of reflex action, I may mention that Brown-Séquard reports many similar cases in which the disorder was clearly referrible to irritation of the fifth nerve. He says,—"In a case of hyperæmia of the eye, which had resisted for a year many kinds of treatment,

* Carter's "Pathology and Treatment of Hysteria," page 24, cited in Carpenter's "Human Physiology."

Dr. Emmerich, quoted by Schiff, states that an immediate cure was obtained after the extraction of a tooth. Professor Paul F. Eve, of Tennessee, U. S., suggested the idea of the extirpation of a carious tooth to Dr. H. F. Campbell in a case of ophthalmia, and the operation having been performed, the patient was at once cured.* In a case recorded by Vallez, quoted by Schiff, there was strong hyperæmia of one eye, with abundant mucous secretion, followed by an ulceration of the cornea, in a man who had received a deep wound in the face, dividing the supra-maxillary nerve. Dr. Alcock, in his important article on the Fifth Pair of Nerves, relates experiments on animals, in which an injury to the infra-orbitalis nerve had produced inflammation and suppuration of the eye. It is worthy of remark that in these experiments, when the wound healed, the eye returned to its normal condition."† Sir James Paget mentions a case in which, owing to the destruction of the trunk of the trigeminal nerve by the pressure of a tumour near the pons, the whole nutrition of the corresponding side of the face was disordered: "the patient had repeated attacks of erysipelatous inflammation, bleeding from the nose, and at length destructive inflammation of the tunics of the eye and ulceration of the cornea."

The whole of the disorders of the eye constituting the group now in question are undoubtedly due, in my opinion, to morbidly excessive energy of the nervous centres which originate that positive motor force by which the normal nutrition of the several structures of the eye is effected. The question—What is the medium by which that force is conveyed? or, in other words,—What is the positive motor nerve which presides over the nutrition of the face, and especially over that of the eye?—has long remained without an answer. Arguing analogically, I have been led to infer that, inasmuch as fibres of the *portio dura* are known to supply positive motor force to the parotid and submaxillary glands, so fibres of this motor nerve convey a like force to the structures in question in order to render them elective of those elements of the blood necessary for their nutrition and repair. The important discovery of Meissner,‡ that when the innermost fibres only of the trigeminus are divided the eyeball inflames, its sensation remaining meanwhile complete, is not inconsistent with this view; it shows, however, that the problem of the innervation

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* See below, p. 181, for fuller particulars of this interesting case.

† "Lectures on the Physiology and Pathology of the Central Nervous System." Philadelphia: 1860. Pp. 157-8.

‡ "Henle und Pfeufer's Zeitschrift" (3), p. 96, quoted by Eulenberg, *op. cit.*, p. 93.

of the eye is very complex, and that as yet we are far from having solved it. In the present state of our knowledge I am unable to concur with Sir James Paget* and Eulenberg† in regarding the fibres of Meissner as "trophic," for, clearly, if they convey trophic, nutrient, or positive motor force to the structures which they innervate, their division, disabling them from continuing that force, cannot result in that exaltation of the nutritive processes constituting inflammation. It may be that these fibres are centripetal, and that they converge into vaso-motor nerve-centres, which are functionally related to the eye, and which, ceasing to receive their normal stimulus from the fibres in question after their division, lapse into a state of paresis, or inability to counteract the preponderant energy of the positive motor or really trophic fibres, which, according to my suggestion, are contained in the *portio dura*. This idea concerning the nature and functions of the innermost fibres of the trigeminus, to which Meissner's experiments have drawn special attention, seems to receive confirmation from the observations pointing to the conclusion that, as stated by Eulenberg, the trigeminus performs the office of a vaso-motor nerve.‡

Inflammation of the Cornea.—By way of additional proof of the applicability to the cornea of the doctrine explained in this section, I may refer here to the fact, already mentioned,§ of the termination of nerves in the nucleoli of the constituent corpuscles of that structure. Any morbid intensification of the action of those nerves cannot fail to modify the structure itself, and hence, as it seems to me, it is easy to understand the frequent clouding and the less frequent, but several times noted, ulceration of the cornea as complications of trigeminal neuralgia.

Glaucoma, or excessive development of the vitreous humour, is a phenomenon essentially identical with that of hypertrophy of other structures, and is, there can be no doubt, due to excessive action of trophic nerves, as hypertrophies of other kinds have been shown to be. It is true that glaucoma has been alleged to be a consequence of vaso-motor disturbance, and that an attempt has been made by Wegener‖ to explain how it is produced by reflex action of the trigeminus on the sympathetic; but his ex-

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* "Lectures on Surgical Pathology." Third edition, p. 36.

† *Op. cit.*, p. 93.

‡ "Der Gefässnerv dieser Theile ist der Trigeminus; es befinden sich also die vasomotorischen Nervenröhren, welche in den Bahnen der einzelnen Trigeminusäste verlaufen, während der neuralgischen Paroxysmen in einem paretischen oder paralytischen Zustande." *Ibid*, p. 96.

§ See above, pages 37-8.

‖ "Archiv. für Ophthalmologie," XII., Abth. 2, p. 1—22, cited by Eulenberg.

planation, in so far as I am able to apprehend it from Eulenberg's account of it, seems to me rather to darken than to illuminate the subject. On the other hand, recent researches by Hippel and Grünhagen,* also referred to by Eulenberg, "make it probable," he says, "that in the origination of glaucoma the sympathetic takes no part, and that the influence of the trigeminus is direct: stimulus of the medulla oblongata at the roots of the trigeminus is followed by a continuous and very considerable increase of intra-ocular blood pressure—an effect which cannot be produced by irritation of the vaso-motor nerve-centre, as excitement of the latter causes contraction of the vessels and, consequently, diminution of the pressure."†

Inflammation of the Ear.—Dr. Brown-Séquard relates a very interesting fact at once illustrative of, and explicable by, the doctrine in question—viz., that he has seen purulent otorrhœa "taking place at every attack of neuralgia of the auriculo-temporalis nerve in a young girl."‡

Inflammatory Disorders of the Skin.—I have already adverted to skin affections consequent on neuralgia through the medium of the negative motor (vaso-motor) nerves, which deprive the affected part of its normal supply of blood; but there are other cutaneous disorders of an exactly opposite kind associated with neuralgia—viz., those which are produced by excessive action of those positive motor nerves which are the causative agents of the nutrition of the skin. When the centric hyperæmia of sensory nerve-cells, which is the proximate cause of the neuralgia, is extended to adjoining cells, presiding over cutaneous nutrition, morbid phenomena of various kinds may be induced, but their most typical form is Herpes, and especially Herpes zoster, or shingles, which is now almost universally admitted as being often associated with neuralgia. Rayer, G. Simon, Notta, D. Parsons, Delioux, Romberg, Parrot, and others, mentioned by Brown-Séquard,§ have related many cases which leave no doubt on this point. Hasse mentions, besides the zona, the following skin affections as having been caused by neuralgia—erythema, pemphigus, and urticaria. Dr. Charcot, quoted by Sir James Paget,‖ has recorded several cases in which "irritation of certain of the nerves of the limbs was followed by eruptions on the portions of the skin supplied by those nerves." Dr. Inman observes that severe pleuritic pains precede and follow the occurrence of *herpes zoster* for a consider-

* "Archiv. für Ophthalmologie," XIV., 3, p. 219.
† Eulenberg, *op. cit.*, p. 93.
‡ *Ibid*, p. 163.
§ In his paper on Diseases of Nerves in Holmes's "System of Surgery," Vol. III., p. 890.
‖ "Lectures on Surgical Pathology." Third edition, p. 31.

able period. "In Herpes Zona," says Sir James Paget, "the range of the inflammation seems to be determined by the course and distribution of the cerebral or spinal nerves of common sensation, and in this, as well as in other forms of herpetic eruption, the attack is often preceded by violent neuralgia, and severe burning pain may persist in the part for some time even after the eruption has cleared away." Urticaria very often occurs as an associate of dentition, and is, of course, caused in this case by the extension of the hyperæmia induced in sensory nerve-cells by dental irritation to cells related to positive motor nerves affecting the nutrition of the skin; it is therefore easy to understand how centripetal irritation of the ordinary neuralgic type may also originate urticarial eruptions. Moreover, as is well known and stated by the best authorities, both herpes and urticaria are not only produced by reflex action originating in a variety of physical causes, but are also the products not unfrequently of strong mental emotion. Erysipelas has been several times observed as an accompaniment of neuralgia, and is usually limited to the area of pain. Though it is, perhaps, most frequently seen as an accompaniment of trigeminal neuralgia, it may be associated with neuralgia in any part. Dr. Anstie expresses the opinion that sufferers from trigeminal neuralgia are peculiarly prone to erysipelatous inflammations in the region of pain; and this remark is equally true in respect to sufferers from neuralgia in any other part of the body. Sir James Paget has seen cases in which, "after injury of the brachial plexus, the fingers have assumed a smooth, glossy, tapering appearance, almost void of wrinkles, and hairless, pink or ruddy, or blotched, as if with permanent chilblains, and associated with this condition of the skin was distressing local pain." This remarkable result of injury to nerves was frequently witnessed, and is fully described by the American Army Surgeons, Drs. Mitchell, Morehouse, and Keen.* As Sir James Paget observes, "they compare the appearance which it sometimes presents to that of a highly-polished scar, and especially point out that pain of a peculiarly burning character accompanies it."† A case of this kind came under my own care, and a report of it, numbered 73, is given in the last chapter of this volume. A due consideration of these facts cannot fail to enforce the general proposition underlying all that has been said in this chapter—viz., that wherever may be the apparent seat of any neuralgic affection, its real one is in some part of the cerebro-spinal axis, except, perhaps, in certain rare cases, when ganglia of the sympathetic are primarily implicated.

Hypertrophy of the Hair which sometimes accompanies neu-

* "Gunshot and other Injuries of Nerves." Philadelphia: 1864.

† "Lectures of Surgical Pathology." Third edition. P. 32.

ralgia is, of course, an expression of the same morbidly excessive energy of nutrient nerves, as are the other phenomena comprised within the group of complications now adverted to. Ponteau, quoted by Notta, reports a case of supra-orbital neuralgia, in which the hair of the parts where the pain was most acute became thicker and stiffer than that on the other parts of the head: the hypertrophied hair could not be made to lie flat as the healthy hair did.

Exostoses and other Morbid Developments of Bone.—Another result of the morbidly excessive action of positive-motor nerves to which I shall advert is very striking, and possesses a special interest, because it induced an eminent physician, Sir Henry Halford, to propound a remarkable pathological theory, which I have already described, and which, though not generally accepted by the profession, has never, so far as I am aware, been decisively confuted. I refer to the morbid thickening of bones, especially those of the skull, which is sometimes associated with neuralgia. Sir Henry mentions three fatal cases of the disease, in which a considerable thickening of the cranial bones was discovered by *post-mortem* examination; he also describes a case with "rending spasms," in which a cure was effected by the extraction of a tooth having a large exostosis on its root, and another in which recovery immediately followed an exfoliation of a portion of bone from the antrum of Highmore. One of these cases was that of Dr. Pemberton, whose unrelieved sufferings excited an unusual amount of interest. According to Travers, who made the *post-mortem* examination (and whose account of it, not having the original at hand, I quote from Romberg), "the frontal bone was unusually thick, having a diameter of three-eighths of an inch above the frontal sinuses, and of more than two-eighths at its junction with the parietal bones. In the falx cerebri, not far from the crista galli, there was an osseous concretion. There was congestion at the surface, and within the white matter of the right hemisphere, while the left showed no trace of it. The right lateral sinus was also full of blood in the vicinity of its communication with the jugular vein. The ventricles contained seven-and-a-half drachms of serous fluid." The second case referred to by Sir Henry Halford was that of a person who died of the disease, aud whose skull was shown to him by Sir Astley Cooper. The internal surface of the frontal bone of it is said to have been "a perfect rock-work." The third case was under Sir Henry's own care. The patient, a lady sixty-five years old, after enduring ten years of torture, "defying all powers of description, and after taking twenty-seven pounds of carbonate of iron (!), died of apoplexy. The head was opened after death, and an enormous thickening was observed of the frontal, ethmoidal, and sphenoid

bones, in one part to the extent of half an inch; and the anterior lobes of the brain were curiously moulded and indented by the thickened bone. There was thickening also of the whole of the cranium, but not to so great a degree anywhere as in the parts which have just been mentioned." Romberg relates the history and *post-mortem* appearances of a very instructive case, which I have already adverted to (at p. 18), of facial neuralgia with thickening of the skull. In the left cavernous sinus "the internal carotid was distended to double its ordinary calibre, so as to form an aneurism both in its anterior and posterior arch. . . . As the ganglion Casseri lay between the plates of the dura mater, at the external side of the aneurism, it was necessarily exposed to pressure from it,—the more so as the base of the brain showed no change of position of the external wall of the left cavernous sinus, and therefore the Casserian ganglion was bound down to the side of the body of the sphenoid bone by the tense dura mater."

In this case, at all events, the long-continued and terrible agonies of the sufferer, which are carefully described by Romberg, had a clearly appreciable cause—consisting of the double aneurism, and there can be little doubt, I apprehend, in the minds of my readers that the thickening of the skull and several other morbid phenomena, which I have not thought it necessary to mention, were a consequence of the extension of the morbid state engendered by prolonged irritation of the Casserian ganglion to those nerve centres originating the nutritive force distributed to the bony as well as to the soft structures of the head. The neuralgia to which Dr. Pemberton was a victim was not accounted for by any of the *post-mortem* appearances observed and recorded by Travers, and therefore cannot be profitably discussed in this connection. Of the second case of cranial thickening mentioned by Sir Henry Halford we have no history, and no *post-mortem* account. We are simply told that death was caused by neuralgia, and that the internal surface of the frontal bone was a perfect rock-work. And though in the third case the results of a *post-mortem* examination revealed no satisfactory cause of the disease, Sir Henry Halford's doctrine, based upon the facts he adduces—viz., "that neuralgia is caused by some preternatural growth of bone in some part of the animal economy, where it is not usually found in a sound and healthy condition of it, or with a diseased bone"—is signally incapable of affording an adequate explanation of the nature and collateral phenomena of the malady. Romberg's case is the only one of those now in question in which a really exhaustive *post-mortem* examination was made and recorded. In that case the facts discovered fully comply with the requirements of my hypothesis; and when considered in connexion with the previous

exposition of the mode of production of all the other symptoms of neuralgia, will, I think, be admitted as a reliable indication of the nature of the proximate cause of osseous hypertrophy in those cases in which the remote cause of the disease has not been discovered. If this opinion be correct, it is obvious that the thickening of the skull, on which Sir Henry Halford relied for the support of his theory, is not a cause but a consequence of the disease. Indeed, the doctrine explained in this chapter leads me to believe that even in those cases of dental exostosis in which extraction of the affected tooth is followed by an immediate and permanent cessation of the neuralgia from which the patient previously suffered, the morbid bony excrescence is generally not the real cause of the pain. I freely admit that nothing seems more reasonable than the opinion which is commonly held, and which seemed to Sir Henry Halford to enforce his doctrine most conclusively—viz., that in such cases as those just mentioned the exostosis is really the cause of the neuralgia, seeing that the pain ceases as soon as the tooth, on the fang of which the morbid growth occurs, is extracted; but I venture to say that in the majority of these cases either neuralgia or dental caries, originating irritation of the sensory part of the dental nerve, precedes the exostosis, that the latter results from morbid hyperæmia of centric nerve-cells related to the positive motor nerve filament of the affected tooth, that hyperæmia originates in irritation of the sensory nerve of the same tooth, and is developed by extension of the hyperæmic state from sensory to trophic nerve-cells, and that if at an early stage of the neuralgia, when, however, it has become thoroughly established, the tooth in question be extracted, the neuralgia will be arrested, but no exostosis will be found. Nevertheless I do not mean to affirm that in no case is morbid growth of bone on dental fangs a cause of neuralgia; for, on the contrary, I can readily understand and believe that irritation, either painless or associated with very slight pain, occurring in one tooth, may be reflected on to another in the form of morbidly excessive nutrition, and that this may result in such enlargement of some part of its root as to cause pressure on, and consequent irritation of, its own sensory nerve, which may then induce centric hyperæmia issuing in neuralgia. Moreover, for the production of such an exostosis it is not even necessary that the primary irritation should occur in a dental nerve. Irritation of a centripetal nerve remote from the dental may be reflected on the teeth; but, of course, inasmuch as impressions made on the fifth nerve are more likely than any other to be reflected directly on to them, irritation of any one of its numerous branches is most capable of originating dental exostoses, which may become the proximate causes of neuralgia in the manner now explained. I apprehend, however, that such cases are extremely rare, and re-

peat that in my opinion dental exostoses are, in the great majority of instances, associated phenomena merely, and in no true sense causes of neuralgia.

The Development of Tumours associated with Neuralgia.—I have already alluded to Dr. Fothergill's idea that neuralgia is an expression of, or is associated with, the cancerous diathesis; and the description now given of the *rôle* played by what I call the positive motor nerves in producing the phenomena of inflammation and hypertrophy, or excessive local nutrition, in certain cases of neuralgia, goes far to justify, in my opinion, the notion which was entertained by that distinguished physician. Indeed, it seems to me that evidence already accumulated affords strong support to the doctrine that, just as sensory nerve cells, when hyperæmic, produce pain referred to the peripheral ends of the nerves related to those cells, and just as the nerve cells presiding over the processes of textural nutrition when hyperæmic produce, as described in certain cases of neuralgia, through the agency of the positive motor nerves, various grades of inflammation and hypertrophy, so when those positive motor nerve cells are exclusively or mainly hyperæmic to a morbid extent, they produce an excessive local growth, or morbidly great cellular development of, or in, the particular structure supplied by the nutrient nerves emanating from those cells. Tumours of all kinds, whether called benignant or malignant, are, I am disposed to believe, produced in this way. Assuming the probable correctness of this explanation, and that the nutrient force, when energetic to a morbidly great degree, is likely to manifest itself most intensely along the line of its passage, we are enabled to understand how it is that tumours within the sheaths of nerves themselves are so wonderfully numerous as they are in many well authenticated cases: "among the neuromata," remarks Sir James Paget, "the fibrous tumours reach their climax of multiplicity, existing sometimes in every considerable nerve in the body, and amounting to 1,200 or more in the same person, and may affect, as in the case described by Mr. Sibley, the nerves both within and without the spinal cord."* Moreover, I venture to throw out the suggestion that what is called the cancerous diathesis consists in an undue proneness of the nutrient nerve-cells generally to become morbidly hyperæmic, just as the neuralgic diathesis may be said to consist in an undue proneness of the sensory nerve-cells to become morbidly hyperæmic, or just as the spasmodic or epileptoid diathesis may be said to consist in an undue proneness of the nerve-cells presiding over muscular action to become morbidly hyperæmic in the same manner.

The doctrine here insisted on respecting the origin of the trophic

* "Lectures on Surgical Pathology." Third edition. Pp. 483-4.

phenomena in question shows how necessarily intimate is the centric connection between the tendency to neuralgia and the tendency to inflammation and hypertrophy; and experience affords ample confirmation of this doctrine: Trousseau describes several cases in which cancer of the womb was associated with paroxysmal pains having all the characteristics of "typical" or "true" neuralgia; and, referring to painful tumours of various kinds, Sir James Paget suggests that the account of all of them "makes it probable that the pain the patient feels is, in great measure, neuralgic or subjective; that it has the tumour, indeed, for an exciting cause; but that it owns, besides, some morbid condition inherent or cumulative in the nerves themselves, so that at times they respond with a morbid exaggeration, to an habitual or slightly increased stimulus. And if this be true of the most painful tumours, it is probably true, in various measures, of many others. Even among cancers, though they are generally more painful than other tumours, a large part of their painfulness, when not due to inflammation of their substance, is characteristic of the patient more than of the disease."*

Anæsthesia or Paralysis associated with Swelling at the Seat of Pain is an occasional phenomenon of neuralgia, and denotes, of course, a condition of the nervous centres related to the affected parts different from that already described. The anæsthesia (paralysis of sensory nerves) and the motor paralysis already adverted to were shown to be probably due in the majority of cases to hyperæmia of sympathetic nerve-centres. Such hyperæmia occurring in nervous ganglia presiding over the blood-vessels distributed to sensory or motor nerves, or to nerves of special sense, would, as already explained, cause them to become more or less anæmic, and would thus deprive them to a corresponding degree of their functional power. But when the whole affected region is swollen, it is obvious that this hypothesis fails to explain the presence of paralysis, either sensory or motor, which is sometimes, though rarely, observable in these cases. The proverb, *extremes meet*, or, as the French word it, *les extremes se touchent*, is, however, no less applicable in the region of physiology than in other spheres of life: hyperæmia, when productive of passive congestion, is not less capable than anæmia of arresting the functions of the part affected, and thus of producing anæsthesia or paralysis to an extent proportionate to that of its immediate cause. When there is considerable local swelling, the result of what is sometimes termed 'passive infiltration,' or, in other words, when there is swelling unaccompanied by active inflammation, the terminal branches of the palsied nerves will be bathed in a more or less stagnant flood of serum exuded from the swollen and overflowing capil-

* "Lectures on Surgical Pathology." Third edition. P. 497.

laries, and preventing the access in quick succession of fresh oxygen-laden corpuscles, the fervent life-giving freights of which are an indispensable element of nervous action. Without oxygen sentient nerves cannot perceive, and motor nerves are powerless to convey the impulses imparted to them.

Hyperæmia and Hypertrophy induced by Sleep.—In confirmation of the doctrine expounded in this section, viz., that textural nutrition is a consequence of nervous action, I may mention here two interesting facts which I have recently observed, and which exemplify in a remarkable manner how greatly that process may be influenced by the state of the cerebral circulation associated with sleep. A gentleman, about fifty years old, of temperate habits and good constitution, was accustomed to go to bed free from pain, and feeling in all respects quite well, but on awaking in the mornings he experienced acute pain in the ball of the right eye, which felt peculiarly hard and tense, and the pain of which was greatly increased if pressure were made upon it. Moreover, there was considerable photophobia. These symptoms, which were experienced in their maximum degree of intensity immediately after the patient awoke, gradually lessened, and generally, in about an hour afterwards they had completely subsided. Sometimes, however, pressure made on the eye even two or three hours afterwards would still cause severe pain. In the second case referred to, a girl about nineteen years old, whose general health was fairly good, whose menstrual function was normal, and who was in the habit of feeling well each night when she went to bed, found each morning when she awoke that the whole of her face and hands were greatly swollen. Soon after she became thoroughly awake the swelling began to lessen, and, in the course of the morning, completely subsided. In her case this remarkable phenomenon of hyperæmia of trophic nerve centres, induced by sleep, was without pain. At page 56, I have described a somewhat analogous case, and have there suggested that the morbid phenomena may have been partly due to vaso-motor paresis; further observations and reflections since that passage was written have, however, convinced me that they were produced by preternaturally vigorous action of trophic nerves. At page 171, *et seq.*, I have expressed my views of the condition of the circulation in the nervous centres during sleep, and have explained how the physiological and pathological phenomena, which that condition induces, are originated. The facts themselves, and the explanation given of them, have an important and very instructive bearing on the question of the nervous origin of trophic phenomena in general.

Anæsthesia or Paralysis unassociated with either Anæmia or Hyperæmia at the Seat of Pain, though seldom observed, occurs,

I imagine, in some cases. I have not noted this special condition, and remember no record of its appearance ; but the fact is, hitherto, students of neuralgia have had, as it seems to me, no scientific hypothesis of the disease capable of intimating to them what they ought to look for as its characteristic signs and products. I believe, however, that observers, aided by the hypothesis here expounded, will find anæsthesia or paralysis, or both together, unassociated with any appreciable anæmia or hyperæmia at the seat of pain, to be a distinctive feature of certain cases of the malady. When a group of sensory nerve-cells is the focus of vascular disturbance resulting in pain referred to some part of the periphery, some of those cells may become involved in passive congestion or serous exudation, and some may have their vital energy temporarily exhausted by morbidly excessive activity, while others may still be the seat of intensely active hyperæmia. In the first and second case anæsthesia in the neighbourhood of pain will ensue ; whereas the continuance of the pain itself, or hyperæsthesia, is the result and expression of the active hyperæmia supposed in the third case still to obtain. But assuming the vascular disorder in question to have extended itself to nerve-cells related to motor nerves, and that the three phases of that disorder just described as affecting sensory nerve-cells should in like manner affect motor nerve-cells, it is evident that, preceded or not by spasmodic or convulsive tendencies, paralysis, more or less pronounced, would come on in the muscles presided over by those nerve-cells which had become the seat of passive congestion, or which had become exhausted by previously over-excessive action, while the persistent excess of energy in other cells would tend to induce involuntary action of the muscles related to them. It is obvious from the whole course of the argument occupying this chapter that these phenomena of anæsthesia and paralysis may present themselves without any vascular disturbance in the sympathetic nerve-centres related to the blood-vessels within the peripheral neuralgic region, and therefore without any disorder, positive or negative, of the blood-currents within that region.

I have now stated in outline the chief complications of neuralgia, but many others would have to be mentioned in order to give a complete picture of them ; nearly all of them, however, belong to one or other of the above-mentioned groups ; and those which do not are easily explicable by the principle by which the phenomena of those groups are explicable. Thus it appears that as a broad general rule those phenomena, as well as neuralgia itself, are expressions of hyperæmia or excessive nutrition of the nervous centres connected with the nerves affected.

"*Epileptiform Neuralgia.*"—The general principles propounded in this chapter afford, I believe, a complete explanation of every kind of neuralgia, whatever may be the part of the body in which it occurs. I shall, however, add a few words on a point which, perhaps, may still seem to some readers, as indeed it did to Trousseau, to be surrounded with considerable obscurity.

Trousseau devotes the whole of one of his clinical lectures to what he calls "Epileptiform Neuralgia," which he subdivides into "simple epileptiform neuralgia," and "convulsive epileptiform neuralgia," to which he also applies the epithet *tic-douloureux*, "in order to distinguish it from what is generally and justly understood by *tic*." By the former term he designated those cases of trigeminal neuralgia in which the patient is suddenly and frequently "seized with horrible pain, which lasts ten or fifteen seconds—one minute at the most, and all is over then without convulsions;" and the patient remains free from pain "until a fresh paroxysm sets in." But "in another case, simultaneously with the accession of pain, all the muscles of one-half of the face are seen to be thrown into rapid convulsive action, and the attack, as in the preceding case, is over in about a minute. This," says Trousseau, "is *convulsive epileptiform neuralgia*." He adds,—"I was not long before noticing that this form, which was amenable to no method of treatment, ran the same course as epileptic aura or vertigo, having the same suddenness of invasion, lasting the same length of time, and being especially like them,—almost incurable. When I compared it with epileptic vertigo, whether or not preceded by a painful aura, and with epileptic fits beginning in one limb, and remaining exclusively limited to it, or again with angina pectoris, I could not but be struck with the analogy and the points of resemblance between these various neuroses."* He afterwards remarks in the same lecture (p. 109),—"Whatever be the analogy between true epilepsy and this epileptiform neuralgia, I must admit, however, that the two diseases are merely analogous, not identical." These passages contain all that Trousseau says concerning the pathology of the disorders in question; but though the pathology he suggests is only shadowed out, instead of being thought out into clearness, it implies, so far as it is expressed, that the nearest approach which, in his opinion, can be made to a correct conception of the essential nature of "*tic-douloureux*" is by likening it to epilepsy. Now, the characteristic phenomenon of epilepsy is morbid muscular contraction, and this takes place only at the bidding of motor nerves; reasoning from Trousseau's premises this is the point we reach, and, as according to him "epileptiform neuralgia" is limited to the face, his expo-

* "Lectures on Clinical Medicine." Translated by P. Victor Bazire, M.D. Part I., pp. 105-6.

sition *implies* that the seventh nerve, or *portio dura*, is always involved in the disease ; but how it is so, and by what process of causation the effects observed are produced, he leaves unexplained. If, however, he throws no light on the subject, he certainly does not darken it, as, it seems to me, was done by Dr. Downing.

Before the discoveries of Sir Charles Bell became known it was commonly believed that facial neuralgia consists of a morbid affection of the *portio dura*, and Dr. Downing, in his "Monograph," published in 1851, says,—"Many persons of eminence in this country still believe" that this nerve is often the seat of tic-douloureux. He held this opinion, and supported it by reference to the three following facts :—*First*, that sometimes "the agony springs distinctly from the stylo-mastoid foramen, and shoots along the well-known course" of the branches of the *portio dura ; Second*, that there is "convulsion of the small muscles to which these small branches are distributed ;" and, *Third*, "it is not at all uncommon to find symptoms of paralysis precede or accompany this form of tic-douloureux." Dr. Downing adds :—"Some time since I met with a case of *neuralgia alternating with paralysis of the facial nerve*, which appears conclusive as to its occasional excitement." Moreover, he says :—"Even if it be conceded that the *portio dura* is exclusively motor in function, it may be questioned whether it is on that account totally destitute of sensation ; and, if so, whether this may not be greatly increased by disease, in the same way as bone and ligament, which are nearly senseless during health, become highly excited and painful when inflamed." In corroboration of his opinion, he gives five cases, which he considers to have been cases of neuralgia of the *portio dura*, the symptoms of which he describes as follows :—"Pain of a convulsive, plunging character, occurring in paroxysms ; seated on the side of the head and face, but more especially centred in front of the ear. The patient places his finger over the stylo-mastoid foramen, and traces the course of the agony along one or all of the branches of the nerve. The side of the face, or the whole head and neck, feel more or less benumbed and rigid. Tightened bands appear to the sufferer to pass under the skin in various directions, and to thrill and jump upon the slightest motion. The head is held perfectly steady, as the least movement to one side, or even forwards, will bring on a paroxysm. The opening or closing of the mouth will do so likewise. In addition, the muscles of expression are frequently brought into spasmodic action, so that the countenance is more or less distorted ; and occasionally, when the temporo-facial branches are particularly affected, bright streams of light appear to the sufferer to pass along the nerves which are in agony. The slightest touch is sufficient to induce this luminous current.

"Perhaps the most characteristic symptom is the *sensation* of *constriction* of the face and head. By the description of patients, it would appear as if the pes anserinus was powerfully contracted, and inclosed the cheek in a net, whenever what they call 'the spasms' came on. In conclusion, I have noticed one peculiarity in these cases where the motor nerve is principally disordered, which I hope to see confirmed by future observers. The character of the pain differs somewhat from that of tic-douloureux of the sensitive nerves. The seizures are of a *tonic* rather than of a *clonic* nature, and suggest the idea of *tetanic* more than *convulsive* spasms of the nerves. The patients complain of a *dragging sensation*, continuous for some length of time, very different from the ordinary twitching, catching feelings, observed during the paroxysmal intermissions of other forms of neuralgia." *

Now, I can no more recognise the truth of the special hypothesis maintained by Dr. Downing, in order to account for the morbid phenomena of the motor division of the seventh nerve just described, than I am able to admit his hypothesis of the proximate cause of neuralgia in general. Swan has shown that by the union of the *portio dura* and the trigeminus at their periphery, the former nerve obtains some sensory filaments from the latter. In so far as it does so, it may, by a certain license of language, be said to possess sensory power, and to that extent may, of course, seem to become the seat of pain. But to say that it is capable of sensation throughout its course is to imply that a nerve, the constitution of which precludes it from producing any modification in any part of the sensory ganglia, is nevertheless capable of transmitting sensory impressions to the brain. Now, that it cannot do this has, I think, been so completely proved by an abundance of physiological experiments that no further doubt on the point is admissible. But while Dr. Downing's theory is decisively opposed by established physiological facts, the phenomena which he sought by means of that theory to explain are in perfect harmony with the pathological principles which I have advanced, and, I venture to affirm, become intelligible only when the light of those principles is thrown upon them. When any branch of the trigeminal nerve is irritated, no result is more likely than a transmission of the morbid impression by reflex action along the *portio dura*; for, in fact, this motor nerve is the complement of the sensory portion of the trigeminus, although the two nerves do not as the spinal nerves do, run together in a common sheath. Any excitation propagated from the nerve-cells of the sensory division of the

* *Op. cit.*, p. 237, *et seq.*

fifth to those of the motor division of the seventh, may cause in them such hyperæmia as to produce great exaltation of function of the nerve, or such congestion as may produce temporary paralysis, or such flux and reflux of blood in those cells as to induce in the nerve alternate states of a preternatural energy and of paralysis. The former of these states is sure to be the prevailing one, while the other is likely to obtain only in very rare and exceptional cases. Hence it is that slight vibrations, tremors, convulsions, spasms, and a sensation as of tightened bands, or as if the face were dragged, are the prevailing symptoms, when the morbid impressions are reflected on to the nerve of expression. These symptoms are so well enumerated in the paragraph already quoted from Dr. Downing that I am glad to avail myself of his description. Moreover, I may add what some pathologists will perhaps hold to be an apparent justification of Dr. Downing's doctrine: cases occur in which the only morbid phenomenon consists in involuntary and more or less convulsive movements of the facial muscles—a disorder designated by Trousseau, "simple tic." Probably nothing is known of the remote cause of the disorder, the proximate cause of which (supposing there be no irritating agent along the course of the nerve) is hyperæmia of the centric nerve cells which originate the impulses transmitted along the nerve. Now if these impulses become exceedingly powerful, they will produce frightful contortions of the countenance, and pain more or less acute may then be associated with the morbid and violent muscular contractions, or facial spasms. The tri-facial nerve, filaments of which are distributed to the affected muscles, transmits an impression of their morbid state to the sensorium by the only means it has of inducing a consciousness that the part of the organism which it innervates is disordered —viz., the production of pain. In the form of neuralgia here described the proximate cause is hyperæmia at the origin of both the *trigeminus* and the *portio dura*, and the most characteristic phenomena (the muscular contortions) are expressions of the morbidly excessive action of the latter; but though the pain experienced originates in the morbid muscular contractions, its possibility depends on the existence of the fifth nerve, through the agency of which that modification of state in the sensory centre related to it which results in pain is effected. Hence even in this case the neuralgia is an affection, not of the motor division of the Seventh, but of the sensory division of the Fifth nerve.

CHAPTER IV.

THE PATHOLOGY OF VISCERAL NEURALGIA.

The pathology of these affections differs, I apprehend, considerably from that of ordinary neuralgia, in so far as the order of sequence in which the phenomena constituting them present themselves are concerned : it is in this respect closely analogous to the pathology of that kind of facial neuralgia which, as I have endeavoured to show, has been miscalled neuralgia of the *portio dura*. It is only too well known that cramp of voluntary muscles is associated with, and, I venture to say, is productive of, intense pain. The commonest form of this affection occurs in the muscles constituting the calf of the leg, and comes on almost exclusively during the night. It is undoubtedly of centric origin, and its proximate cause consists in hyperæmia of the spinal cord, a condition the development of which is especially favoured by sleep. The intercostal muscles, which, in respect to their functions, may be said to occupy a position mid-way between those of voluntary and involuntary muscles are also peculiary liable to cramp of an acutely painful kind. Passing to wholly involuntary muscles, I may advert to the terrific pains experienced at the very onset of labour as an example of the great suffering which the mere contractions, when vehement, of a hollow involuntary muscle may occasion. The exact mode of innervation of the viscera is far from being well ascertained, and great vagueness of thought as well as much misconception has prevailed, and even now prevails, concerning it. It seems to have been imagined that, because the organic functions are performed without the intervention of the will, and because they have appeared to be presided over by the great sympathetic nerve, the life of the viscera is, in a certain sense, apart from and independent of the cerebro-spinal system. But now that the main function of the sympathetic, the method of glandular innervation, and the functional relation of the cerebro-spinal axis to the processes of nutrition are becoming more accurately understood, the clouds which have veiled the relation subsisting between the cerebro-spinal and the sympathetic nervous system are being dispersed, and the parts they severally play in effecting the nutrition and functions of each member of the entire organism are becoming clearly distinguished and understood. I apprehend that the time will come when the several ganglia of the sympathetic will be regarded as only so many reservoirs of

force derived from the spinal cord—reservoirs developed as agents by which that force may be more slowly and equably distributed than it could be were it directly transmitted from the cord to the various structures of organic life, the healthy functions of which depend on their equable and continuous reception of its energizing influx. If this interpretation of the relation of the sympathetic to the cerebro-spinal system be correct, it enables us at once to understand that in organisms of different grades in the animal scale, and even in different parts of the same organism, the amount of differentiation of the nervous system into spinal and sympathetic respectively may differ greatly, although the functions carried on by those two systems are performed in no appreciable respect differently in the different cases. Hence it is, as it seems to me, that while in the upper part of the human body, and notably in the head, the blood-vessels are under the government of nervous centres distinctly differentiated from the spinal cord, "in the other parts of the body the nerves of blood-vessels seem to come chiefly from the cerebro-spinal centre, as well as the cervical sympathetic. If we divide transversely a lateral half of the spinal marrow in the dorsal region, we find in the lower limb on the same side most of the effects of a section of the sympathetic in the neck."* This observation is in interesting accordance with that of Mr. Joseph Lister, who, when investigating the influence of the nervous on the vascular system by means of experiments on frogs, found that by irritating the spinal cord he caused the arteries to contract vehemently—sometimes even to closure.†

It thus appears that both reason and experiment lead to the conclusion that the many and extremely diverse results achieved by the nervous system are but heterogeneous expressions of a homogeneous force operating with different degrees of directness, and under different conditions in the different cases. This conclusion accords with the conception generally prevalent in the most scientific minds, of the essential unity of structure which pervades alike the whole animal kingdom and each individual organism. Assuming that the characteristic distinction between the spinal and sympathetic nervous centres does not consist in any difference in the nature of the force emanating from them, but *first*, in the mode of action of that force, and *second*, in the difference of degree in which their functions are withdrawn from beneath the government of the will, we can readily understand how those distinctive modes of action, and those characteristic features of voluntary and involuntary motor nerves gradually and

* Brown-Séquard. "Lectures on the Physiology and Pathology of the Central Nervous System," p. 146.

† Proceedings of the Royal Society, 1858.

insensibly merge into each other. Now, if the motive force of voluntary and involuntary muscles is essentially the same, it follows that a morbidly excessive afflux of blood in the involuntary motor nerve centres will induce excessive contraction, spasms, or cramp of the involuntary muscles subordinate to those centres, just as cramp of voluntary muscles, proceeding even to the extent of tetanus, is caused by a morbidly excessive afflux of blood in the spinal cord, that muscular disorder of the kind in question is likely to occur more or less in both the voluntary and involuntary system of the same patient, and that persons liable to those hyperæmic disorders of the nervous system denoted, on the one hand, by ordinary neuralgia (when sensory nerve centres are mainly affected), and, on the other, to epileptoid affections (when motor nerve centres are mainly affected), are also most especially liable to those agonizing neuralgias of the viscera of which angina pectoris, at once the most mysterious, the most terrible, and the most deadly, may be justly regarded as chief.

The innervation of the viscera also comprises, of course, the other sets of motor nerves already dwelt upon—viz., the two-fold group, which I have called positive motor, and which, while endowing glandular structures with their functional power, also render all organic tissues selective and attractive of their appropriate nourishment.

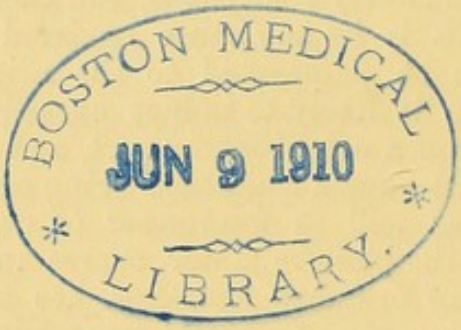
It has seemed to me lately that, though recent investigations have proved that the functional power of glands is, as a general rule, derived directly from the cerebro-spinal system, the force in question may have in certain cases a secondary origin. If, as already intimated, the sympathetic ganglia are reservoirs of force differentiated from the spinal cord in order that that force may be the more secluded from extraneous influences and disturbances originating in the mind, and may thus exert itself more equably and continuously than it otherwise could do in carrying on those functions in which it is expended, it seems reasonable to expect that some glandular organs, the functions of which are most remote from, and independent of, mental influence, should be governed by nervous centres differentiated in a maximum degree from the cerebro-spinal axis. And this mode of innervation is the more easily conceivable when it is considered that if a motor nerve were divided into two branches, the filaments of one branch being distributed to the cellular structure of a gland, and those of the other to the muscular coat of the artery nourishing it, the gland would, in fact, be poised between two counterbalancing forces, just as effectually as if the nerve distributed to the cellular elements of the gland came directly from the spinal cord; whereas that distributed along the artery came from the sympathetic. Of course this supposition involves a very important assumption—

viz., that the force passing from the spinal cord and from the sympathetic respectively is essentially of the same nature, and different only as regards the mode (in one case direct, in the other indirect) in which it is supplied. This assumption is as yet incapable of either proof or refutation, but it accords with that conception of the fundamental unity of the nervous system to which I have adverted, and indicates in so far as the motor functions of that system is concerned, how all its exceedingly diverse operations may be carried on by one and the same force exerting its influence on different structures, and adapted to them in different ways, according to the peculiar exigencies of the several organs constituting the body. If the views here suggested have any foundation in fact, they afford an additional countenance to the idea that those nerve-cells related to the motor nerves of muscles, and those related to what I call the positive motor nerves of any particular region, are closely contiguous, and therefore, that when the one group of cells is by any cause rendered hyperæmic, this condition is likely to be propagated to the neighbouring group. Hence visceral cramp is likely to induce excessive glandular action, or hypertrophy of a neighbouring part, and conversely either one or both of the last-named conditions being established may be a proximate cause, as well as forerunner of cramp. The part generally played by the positive motor nerves in producing some of the phenomena of ordinary neuralgia has been already explained, but in certain cases of visceral neuralgia those presiding over the functions of nutrition are, as I shall endeavour to show, especially operative in originating the disease.

The physiological considerations just advanced concerning the centrifugal or motor nerves connected with visceral neuralgia must now be complemented by a few words respecting the centripetal nerves, which in visceral neuralgia, as in that of other parts of the body, are especially affected. These nerves may be classed into five groups :—(1) those terminating in vaso-motor centres, and which when functioning induce reflex action on blood-vessels ; (2) those terminating in motor centres related to visceral muscles, and which when functioning induce reflex action on those muscles ; (3) those terminating in motor centres related to voluntary muscles, and which when functioning may or may not, according to the dominating power of the will, induce reflex action of those muscles ; (4) those terminating in motor centres presiding over secreting and nutrient processes, and which when functioning induce reflex action of those processes ; (5) those terminating in sensory centres, and which when functioning induce reflex action on the cerebrum, and thus the consciousness of pain.

Visceral neuralgia in the great majority of cases is, I have no doubt, an affection of sensory nerves produced by morbidly ex-

cessive contraction, or cramp of one or more of the visceral muscles. Of course the cramp itself may originate in various ways. It may do so through the agency of the centripetal nerves comprised within the first or second group just mentioned, or it may originate in emotional states, the influence of which is extended to motor centres ; it may be induced by subtle influences (such, for example, as that productive of epidemic cholera), directly operative on those centres, or finally, it may originate in aboriginal instability of circulation in them.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CHAPTER V.

THE SEVERAL KINDS OF SUPERFICIAL NEURALGIA.

FACIAL NEURALGIA.—This, the most common and characteristic kind of neuralgia, has attracted more attention, and has been the subject of more elaborate investigation than any other form of the disease. The wide expanse of the sensory branches of the fifth nerve, the extensively superficial character of its distribution, the inevitable exposure of the face to the ever-recurring vicissitudes of atmospheric temperature, and the great vascularity or eminently vital character of the region over which the nerve in question is ramified, constitute conditions peculiarly favourable for the disturbance of the healthy vital processes of that part of the nervous system distributed to the face. Hence it is, no doubt, that neuralgia occurs most frequently in this part of the body. The disease sometimes extends over the whole of one side of the face, and more or less over one side of the head; but most usually its chief seat is more or less definitely restricted to some particular part of this region, and therefore pathologists, following the natural indication afforded by the division of the sensory nerve of the face into three great branches, have, for the convenience of description, divided facial neuralgia into three kinds—viz., *frontal*, *infra-orbital*, and *mental*. It is, perhaps, well to adhere to this division, but experience teaches that in a large proportion of cases the malady is not confined to any one of the three main branches of the nerve, and, indeed, it often ranges over the whole of them, even when there is a special focus of pain the area of which is so limited as to be coverable by the tip of the finger.

Frontal neuralgia generally seems to radiate from the point where the frontal branches of the ophthalmic division of the nerve emerge from the supra-orbital notch or foramen; and the pain, though frequently diffused over the whole region to which these branches spread, is sometimes confined to a particular spot. The general character of the pain has been already described, and will be still further incidentally indicated in the reports of the illustrative cases given below. Sometimes the affected parts are, during the attacks, hot, tumefied, and tender, and these features are, according to my experience, frequently observable when the scalp is affected. Sometimes they are wholly absent, and pres-

sure over the region of pain seems to give temporary relief. Most frequently when the focus of pain is near the eye, there is a copious flow of tears during the paroxysm, and the conjunctiva becomes hyperæmic, a condition which in many cases does but partially subside with the paroxysm. Occasionally the contents of the orbit become anæmic, a state denoted by a distinctly perceptible shrinking and sinking of the eye. There is not infrequently a certain vibration or twitching, as well as throbbing, throughout the affected part. Sometimes the eye itself becomes acutely painful, and during the paroxysm the agony experienced in these cases is inexpressibly great. When the lachrymal gland has been frequently and powerfully excited, during several successive attacks, the nerve cells related to it are apt to remain morbidly irritable, so that, as Dr. McCulloch justly observes, "tears continue to be not only easily excited in those who scarcely knew before what it was to shed one, but they frequently occur, and even in streams, without any mental cause at all, and not uncommonly in sleep, though no dreams are present; or at the time of awaking; often lasting a considerable time, and producing no small inconvenience." Occasionally the positive motor nerves of the nasal mucous membrane become involved in the disease, and consequently this membrane pours out an excessive quantity of mucus. Associated with the strictly neuralgic affection, there is often genuine headache, now in one part, now in another, but its most usual seat is the vertex or coronal region.

Infra-orbital neuralgia is probably of more frequent occurrence than any other form of the disease. The region of the cheek comprises, in a pre-eminent degree, all those conditions most favourable to the development of the malady. Throughout this area the filaments of the fifth nerve are distributed in especially great abundance: its superior maxillary division sends branches to the bones of the face, over the surface of the palate and the lining membrane of the antrum of Highmore; it supplies the teeth and gums of the upper jaw, emerging at the infra-orbital foramen; passing through the opening in the malar bone, it endows the muscles, skin, and mucous membrane of the lower eyelid, cheek, nose, and lips with sensibility; and its terminating filaments unite with those of the facial nerve. A due consideration of this extensive and diverse distribution affords an adequate explanation of the peculiarly poignant and ever varying character of infra-orbital neuralgia which sometimes affects the osseous structures, more frequently the teeth and gums, and still more frequently the different parts of the face. The doctrine already insisted on—viz., that the *proximate* cause of this malady consists in a morbid condition, however induced, of the nerve cells at the origin of these nerve-filaments to which the

pain is referred shows the futility, and indeed folly, of extracting sound teeth when they become the foci of suffering. The extensive plexiform union of the terminal filaments of the tri-facial with those of the facial ensure the transmission of faithful reports to the sensory centre of every morbid affection of the latter, as well as of the muscles of expression, over whose functions it presides. As filaments of this nerve, uniting with the auriculo-temporal, constitute the positive motor nerve of the parotid gland, as other filaments of the same nerve, contained in the chorda tympani, are in like manner functionally related to the sub-maxillary gland, and as there are, in my opinion, good reasons for believing that the facial also supplies motor influence to the whole secreting surface of the nose and mouth, whenever the nerve cells at the origin of this nerve become excessively hyperæmic, it is likely that there will be not only twitching or convulsive movements of the facial muscles, but a copious outpouring from the salivary glands, and it may be from the nasal and oral mucous membranes also. Sometimes nutritive processes are notably exalted, and the result is shown by an increase of colour and heat, as well as by more or less swelling of the face. "In one lady," says Dr. Downing, "the cheek affected assumed the colour and glistening polish of a boiled shell-fish." The doctor does not specify what kind of "shell-fish," but probably he means a boiled lobster.

Mental Neuralgia occurs less frequently than the forms previously mentioned, and presents no features needing to be specially dwelt upon. When superficial, the focus of pain is usually of course at the mental foramen, and may spread from it over the chin and lower lip, which is sometimes affected with a tremulous or twitching movement. Frequently the pain extends along the lower jaw, and the sufferer complains chiefly of a diffused tooth-ache, throbbing and recurring at intervals with greatly increased intensity. The sub-maxillary gland may pour out an excess of saliva, and if the pain should extend to the tongue, the affected side is often notably dry and white.

Facial neuralgia in each of its different forms may be the result of reflex action originating in various parts of the body. Impressions made on the fifth nerve are, of course, most likely so to affect its centric cells, as to induce the consciousness of pain referred to some part of its periphery, and also owing to its proximity to the portio-dura, it is especially likely through its agency to cause those twitchings or distortions of the countenance which are frequent phenomena of the malady. But impressions far remote from the seat of pain do actually originate it not unfrequently. During pregnancy the great excitement of the spinal cord caused by the continuous series of impressions transmitted to it from the rapidly growing ovum, results in the reflection of

the irritation in various directions—on the gastric nerve-centres, with secondary reflections on the stomach, causing sickness; on the vaso-motor nerve-centres, with secondary reflections on the blood-vessels, causing in extreme cases fainting fits; on sensory centres, causing neuralgia, very frequently of the kind called toothache; and, not seldom, on those centres presiding over the nutrition of the teeth, and causing their rapid destruction or loss. Other uterine affections are frequently productive not only of visceral neuralgia, but of neuralgia involving cerebro-spinal nerves, and among them the tri-facial. During the climacteric period, when the menstrual function is performed at irregular and remote intervals, neuralgia is very apt to supervene and to affect the head; moreover, at any age menstrual disorders, and especially if the flow be scanty, often prove a cause of facial neuralgia, which in such cases is generally associated with plethoric headache. A report of an instructive case of this kind is given below. Sir Charles Bell's experience strongly impressed him with the conviction that disorders of the bowels are most generally productive of the disease, and though he exaggerated the causative agency of these disorders, there can be no doubt that they play an important part in this respect. Caries of the teeth, even when the affected tooth is painless, is probably one of the most frequent sources of facial neuralgia. As a proof of the powerful reflex actions which decayed but still painless teeth are capable of inducing, I need only mention the striking fact, several times observed, that spasms of the retinal arteries so complete as to result in amaurosis have been overcome, and sight consequently completely restored by the extraction of carious teeth.

Cranial neuralgia (Neuralgia cerebralis, Hemicrania, la Migraine) is usually described as a distinct affection, and I shall in this respect defer to precedents which I confess do not seem to me to possess a scientific justification. The malady commonly called hemicrania, must so far as it is painful be an affection of branches of the fifth nerve, or of those distributed to the posterior cervical plexus, and might therefore be most correctly described either as frontal or as cervico-occipital neuralgia, or as both when the whole of one side of the scalp is affected. Neuralgia of the scalp is so often associated with vehement action of the positive motor nerves spread over the affected region, resulting in diffused swelling, as well as extreme tenderness, that this feature has induced pathologists to regard cranial neuralgia as a distinct disorder, which is well described by Romberg as follows :—

"After certain premonitory symptoms, of which chilliness, yawning, bulimia, anorexia, and irritable temper are the most frequent, or without any warning of the kind, one side of the head, and more generally the left, is attacked with pain; it is commonly circumscribed and limited to

the supra-orbital and tem poral regions, or it extends up to the hairy part of the head ; at first trifling, it soon increases more or less rapidly, and is accompanied by a sense of weight and tension. The motor and intellectual functions of the brain increase the pain, for which reason the patient always courts quiet and solitude. Sympathetic affections of the branches of the fifth pair, and of the nerves of sense, are rarely absent. The eye of the corresponding side is painful ; it weeps, and appears smaller. Light and noise cause pain ; scotomata and tinnitus aurium supervene. The hair is very sensitive to the touch, and occasionally stands on end. When the attack has reached its climax, and is approaching its termination, nausea and vomiting come on, and thus a quantity of mucous and bilious matter is got rid of. The attack is generally closed by a profound and refreshing sleep.

"The duration of the paroxysm generally extends to several hours, though it may last an entire day and more. The interval of three or four weeks' duration are generally distinguished by the patients enjoying perfect health ; in the female sex hemicrania is commonly associated with the menstrual period, and occurs before or after it, but rarely during its continuance.

"The disease runs a chronic course ; it may be protracted for several years, or half the individual's life, without an essential alteration in the symptoms.

"A predisposition is afforded by inheritance, by the female sex, and by early life. I have seen girls of seven or eight years of age attacked, whose mothers had been subject to this neuralgic affection. Tissot even asserts that persons who have not been subject to hemicrania up to their five-and-twentieth year continue to enjoy an exemption. It has been a prevailing error since Tissot's time to attribute too much influence to disturbances of the digestive organs in predisposing to the malady ; they and mental affections are, however, undoubtedly the most common exciting causes."

Tenderness over the spinous processes of the uppermost cervical vertebræ manifested by pressure upon them is frequently associated with neuralgia of the face and head.

Cervico-occipital Neuralgia is described as a distinct affection ; but though I have frequently seen patients who complained of pain in the cervico-occipital region, I have not met with any cases of well developed or characteristic neuralgia exclusively restricted to this part, and unassociated with the development of the malady elsewhere. Cervico-occipital neuralgia is mainly an affection of the posterior branches of the first four cervical nerves,and especially of the posterior branch of the second, which ramifies most extensively over the posterior part of the cranium, and reaches even to the parietal region. Considering how near to each other are the seats of origin of the tri-facial and the upper cervical nerves, we see at once that neuralgia of the former may easily be propagated to the latter ; and I incline to the opinion that in the majority of cases cervico-occipital neuralgia does not originate independently, but is engendered by the far more frequent malady—neuralgia of the tri-facial nerve. So far as I have

observed, the disorder in question does not usually present those well-marked paroxysmal features with intermittance and periodical recurrence which commonly characterise facial neuralgia. The pain is more apt to be dull and protracted than acute and transitory, and is often, especially in the neck, so like to rheumatism, that only by reference to the constitutional peculiarities of the patient can the physician assure himself of the probable nature of the disease. But, of course, in those cases in which pressure on the spinous processes of the upper cervical vertebræ produce decided pain, his diagnosis can scarcely remain doubtful.

Brachial Neuralgia.—"Neuralgia occurs less frequently," according to Romberg, "in the brachial than in the crural plexus." I am unable to confirm this statement, for I have seen more cases of neuralgia of the upper than I have of the lower extremity. The malady, as he says, "chiefly attacks the internal cutaneous nerve and the cutaneous branches of the ulnar and radial nerves," and in a large proportion of cases is associated with numbness, especially affecting the ring and little finger, and the ulnar side of the fore-arm. Sometimes the affection is accompanied with extreme tenderness of the muscles, and not seldom with notable alternations of temperature; occasionally also the surface of the limb at one moment dry will become suddenly bedewed with perspiration. In a case in which I was recently consulted, and in which the whole upper extremity was affected, the patient complained that simultaneously with the access of pain the limb became suddenly hot, although the corresponding arm and hand might be notably cold. About fifteen or twenty minutes afterwards perspiration broke out, especially in the hand, and was immediately followed by a subsidence of the paroxysm. I have seen two cases in which the substanceof the brachial muscles seemed to be morbidly affected. Opening and closing the hand caused pain in the flexor muscles of the fore-arm, which was remarkably tender, slight palpation producing pain. I incline to the opinion that in these cases there was considerable paresis of the vasomotor nerves resulting in the congestion of the painful parts. I have already published particulars of one of these cases, and will transcribe the report of it here.

"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 fore-arm 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; some-

times 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 ædematous ; that he had a peculiar feeling in the fore-arm, 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 subject 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."

Neuralgia of the upper extremity is apt to occur along with a like affection of the cervico-occipital region, and both more usually arise in persons peculiarly liable to constitutional disorders of the nervous system, than does facial neuralgia, which is often a phenomenon of reflex action originating in peripheral and recognisable causes. Of course brachial neuralgia is also sometimes occasioned by obvious peripheral irritation. Dr. Downing

reports a case in which "the neuralgic pains in the *left fore-arm* were brought on instantly and invariably by touching the meatus of the *right ear*; and this strange sympathy continued for *three years*."

Dorsal Neuralgia.—This is not a frequent affection, but it sometimes occurs, generally, I apprehend, in patients in whom the spinal cord is in a state of chronic hyperæmia, and consequently of morbid irritability. Delicate women who are most liable to neuralgia generally, are of course also most liable to this form of it, and I have seen it associated with excessive hyperæsthesia of the same region in a case of hemiplegia. Indeed when it is considered that the real seat of neuralgia in all cases is centric, and that cutaneous nerve-twigs from the six upper internal branches, and from the six lower external branches of the posterior division of the dorsal nerves, innervate the surface of the back of the chest, it is evident that abnormal irritability of the spinal cord must occasionally express it through these nerves.

Intercostal Neuralgia may, strictly speaking, be said to comprise mastodynia, as well as pleurodynia and infra-mammary pain, for all pain in the breast is felt through the agency of intercostal nerves. Painful affections of these nerves are very frequent, occur in almost all parts of the thoracic parietes, often extend to the abdomen, are remarkably prone to seize on the left side, and have a peculiar and great practical interest for the physician, inasmuch as they are sometimes mistaken for symptoms of pleurisy or of cardiac disease. Most commonly intercostal neuralgia attacks persons in whom the nervous system generally is preternaturally sensitive, and morbidly susceptible of external influences. A majority of its victims are women, and of the class called "highly nervous" or "hysterical"—whatever the latter phrase may really mean. Pressure on the spinous processes of some part of the vertebral column, generally between the scapulæ, and most likely on the part corresponding to the seat of pain, will cause the patient to shrink suddenly from the hand, or even to cry out. The chief foci of pain are often at the points where the nerves being deep-seated become superficial, and where their branches spread immediately beneath and terminate in the skin. Hyperæsthesia generally at or near the seat of pain is an especially frequent accompaniment; anæsthesia is sometimes also observable, but chiefly in cases in which the malady has been of long duration. The skin at the seat of pain occasionally becomes red as well as hot, but most usually, when there is any disorder of the peripherical circulation, it is denoted by a slight shrinking or wasting of the integument, with more or less numbness, or anæsthesia.

Referring to the tendency of the cutaneous pain affecting the intercostal nerves to spread over "a somewhat considerable area,"

Trousseau, in his 'Clinical Lecture on Neuralgia,' makes the following instructive remarks :—

"This circumstance gives rise to errors in diagnosis every day, and it must be admitted that the patients themselves greatly contribute to mislead us. You remember the young woman who lay at No. 10, in St. Bernard's ward [of the Hôtel Dieu]. She had several very mobile neuralgias, and you very often heard her complain of an acute pain in the stomach, which I tried to calm by the internal administration of bismuth, belladonna, &c. One day, on looking out very carefully for the tender spots of an acute intercostal neuralgia of which she complained, I found exquisite tenderness of the spinous processes of the sixth and seventh dorsal vertebræ, and extreme exaltation of cutaneous sensibility over the parts to which was distributed the anterior extremity of the two affected intercostal nerves; and as these nerves send terminal branches to the whole of the epigastric region, the skin over it was extraordinarily painful. I easily understood, then, that the case was not one of *gastralgia*, but of *epigastralgia*, and it gave me the key to the interpretation of many cases which had formerly seemed very difficult to me. When once my attention was drawn to this point in pathology, I saw a good many analogous instances both in private and in hospital practice.

"It is common, indeed, to meet with women who cannot bear a string round the waist, or the least pressure over the pit of the stomach, and on examining them it is found that in nearly every case there is intercostal neuralgia with epigastralgia. It is very common also to meet with women who complain of cardiac pains which are merely due to intercostal neuralgia; and as this neuralgia is peculiarly frequent in chlorotic and nervous women, that are more than others liable to palpitations of the heart, it follows that both the patient and her medical attendant believe that there exists a connection between the palpitations and the pain in the side, while the connection is merely apparent."

The intercostal muscles are often the seats of acute pain of a cutting or stabbing kind, constituting, I apprehend, what is commonly called "a stitch in the side," although a similar pain is probably sometimes produced by pleuritic adhesions. These muscular pains I believe to be due to temporary cramp of the muscles affected. The cramp produces an impression of itself on the terminal filaments of the sensory nerve, which irritating the sensory cells of the spinal segment to which it is related, and being thence transmitted to the brain, effects a consciousness of pain.

As the abdominal parietes are innervated by the lower intercostal nerves, hyperæmia of the lower dorsal segments of the cord —and especially of those corresponding to the ninth, tenth, and eleventh dorsal nerves—is very likely to express itself by neuralgia, more or less diffused or concentrated, of the surface of the abdomen. A striking illustration of this malady has just been cited, and I have seen a very interesting case of the same kind in which a part of the surface of the abdomen, consisting of an area

about six inches in diameter, just above the umbilicus, was the focus of violent neuralgia, accompanied with heat, redness, and tenderness, just as in cases of ordinary inflammation. Flying pain of the abdominal walls are by no means uncommon, and are often complained of by the poor, ill-fed, and over-worked women who frequent the metropolitan dispensaries. The pains incident to cramp, or morbid contractions of the abdominal muscles, are of course of the same kind, and explicable in the same way as morbid muscular contractions occurring in any other part of the body. It must be borne in mind that as the external branch of the twelfth dorsal nerve is mainly distributed to the skin over the crest and anterior part of the dorsum of the ilium, and that as it sends a branch as far as the great trochanter, morbid states of the lowest segments of the dorsal part of the spinal cord may induce neuralgia in these regions.

Intercostal neuralgia has been so often and so fully described, that I have nothing further to add to the several sketches of its symptoms already in the hands of the profession. There are, however, two or three points in the special pathology of this form of neuralgia to which I think I may with advantage devote a few words. It is stated by Copland that intercostal neuralgias "are frequently independent of any evidence of disorder in the spinal cord or its coverings;" and though he recognises "that these painful affections may depend in some instances upon vascular congestion of a portion of the spinal cord, or of its investing membranes, or upon inflammatory irritation, or some other morbid state in these parts," he expresses the opinion that such conditions of the spinal cord or of its membranes are no more necessary to their production than they are, according to his doctrine, for the production of the phenomena of hysteria. This opinion is expressed still more emphatically by Dr. Downing. "It is true," he says, "that sometimes, by no means always, a degree of tenderness may be discovered over the spinal processes of the vertebræ, answering to the roots of the neuralgic nerves. But are we to infer from this that disease exists within the vertebral canal, originating the painful spasms? I believe not. It may be the effect of the continued irritation of the peripheral extremities of the nerves; as is shown by its sometimes arising after neuralgia, excited by a distinct local cause, has existed for some time." Curiously enough Trousseau differentiates "merely local pain" from intercostal neuralgia by ascertaining whether the pain is or is not accompanied by "tenderness on pressure of the dorsal spinous processes." In the first case the pain, according to him, is neuralgia; in the last it is "merely local." Now if the doctrine I have already expounded be true, painful affections of the intercostal nerves of whatever nature, however originated, cannot

occur under any circumstances without hyperæmia of the corresponding parts of the spinal cord. This hyperæmia may be of all degrees of intensity, and of any duration. When of slight intensity and of short duration, when intense but temporary, or when slight though of considerable duration, the morbid change of the cord at the seat of hyperæmia is not likely to be sufficient to become manifest when pressure is made on the corresponding spinous processes. For the purpose of settling this question, as well as many others, one fact is worth a thousand arguments; and happily in this case I can adduce a decisive one. I have ascertained by experiments, many times repeated, that painful affections of intercostal nerves unaccompanied by any perceptible tenderness on pressure of the dorsal spinous processes may nevertheless be annulled by the application of the spinal ice-bag along the dorsal spine. Therefore, contrary to the opinions of Drs. Copland and Downing, it is manifest that even in these cases the spinal cord is morbidly affected, and that the presence or absence of appreciable tenderness when pressure is made on the spinous processes affords no foundation for the "apparently subtle distinction" which Trousseau claimed to have established, and that we do not, as he thought, "possess a precious sign" in the presence or absence of the tenderness in question, "which enables us to distinguish" neuralgia from "merely local pain." Though in respect to this point, as well as to another which will be presently mentioned, I feel constrained to revise the judgment of this distinguished man and eminently practical physician, I rejoice especially in being able to fortify my main position by his authoritative statement of the fact that in all cases regarded by him as truly neuralgic, tenderness of the spinous process, or processes corresponding to the nerves affected, is a characteristic of the disease so constant, that, as he says, since his attention has been drawn to it, he has "never known it to be absent."

Referring to palpitation of the heart associated with intercostal neuralgia occurring in "chlorotic and nervous women," Professor Trousseau says, at the close of the paragraph quoted above, that both the patient and her medical attendant are apt to believe "that there exists a connexion between the palpitations and the pain in the side, while the connection is merely apparent." That in such cases there is no so-called "organic" disease of the heart causing the palpitations or the pain in the side is well ascertained, and therefore, in so far as the pain in the side is held to be symptomatic of "organic disease" of the heart, the connection between the pain and the palpitations is, as he affirms, not causal, but merely apparent. There is, however, as it seems to me a deeper relation in which these phenomena are really connected with each other, and though not causatively, at least as conjoint

effects of a common cause—viz., a morbid condition, consisting of unstable, irregular circulation in those nervous centres whence originate the cardiac nerves, as well as in the dorsal segments of the spinal cord. The influence of unequable nervous currents along those nerves in producing disorderly and tumultuous action of the heart is well known, and when it is borne in mind how frequently and rapidly a morbid state of one segment of the spinal cord is propagated to neighbouring segments, and even to the collateral ganglia of the sympathetic, and that the extension of this state is most rapid in the nervous systems of the "chlorotic and nervous" patients in question, it is easy to understand how intercostal neuralgia and palpitation are twin branches of one and the same root, or are connected by community of origin, and that it would be strange if in such patients the two affections did not often simultaneously occur.

The proneness of intercostal neuralgia, especially when in the form of infra-mammary pain, to occur most frequently on the left side is a well-ascertained fact reported by a crowd of witnesses, but hitherto, so far as I know, explained by no one. I have thought much over the problem, but so far confess myself baffled by it. And I should therefore remain silent concerning it, were it not that I am anxious to urge attention to the subject. When ever I think of it I feel astonished at the quiet acquiescence of pathologists in the continuance of this mystery; and I am still more astonished that no medical writer I am acquainted with has ever propounded the question, why do women complain so often of pain beneath the left breast, and so rarely of pain beneath the right? The only glimmer of an idea of causation associated with this phenomena which I have met with is that it is a symptom of hysteria. But assuming the existence of that wondrous and Protean entity which is held responsible for almost as many ills as issued from Pandora's box, and notably for almost any disease not otherwise accounted for, and assuming, therefore, that it is the cause of infra-mammary pain, we are still without an answer to the question, why and how does it produce the pain beneath the left mamma only as a general rule? Of the many physiological or pathological problems and charades propounded by nature for the exercise of the human intellect, this one, which is of great practical interest, has been especially neglected; and I sincerely hope that some of the able men who are learned in all the modern lore of neuro-physiology and pathology will have courage to encounter this long-avoided sphinx, and the good fortune to explain her riddle. For assuredly it is explicable: the phenomenon has an intelligible cause, which by the application of fuller knowledge and greater industry than has yet been brought to bear on it will be discovered, and will then probably excite astonishment by its simplicity.

Ilio-hypogastric Neuralgia.—Neuralgic affections of the parts supplied by the anterior branches of the first lumbar nerve have been adverted to by several authors. The skin over the anterior part of the ilium is innervated, as already said, by the external branches of the twelfth dorsal nerve; but besides it the external branch of the ilio-hypogastric supplies the integument over the tensor vaginæ femoris and the anterior part of the glutæus medius, while the internal branch innervates the skin at the inner part of the groin and over the pubis, as well as the scrotum in the male and the labia pudendi in the female.

Gluteal Neuralgia may result from a morbid state of several segments of the spinal cord, for the skin over the gluteal region is innervated not only by the external branch of the last dorsal, and the posterior divisions of the first and second lumbar, but also by the external branches of the posterior sacral nerves.

Pudic Neuralgia may, in like manner, arise from a morbid condition of several of the lower segments of the cord, inasmuch as the pudenda, or external genitals, receive nerves from several spinal centres—viz., the first and second lumbar (by means of the ilio-hypogastric, the ilio-inguinal, and the genito-crural nerves), and from the fifth lumbar, as well as from the first, second, third, and fourth sacral (by means of the superior and inferior divisions of the pudic, and the inferior pudendal branch of the small sciatic). The pain at the orifice of the urethra which occurs in cases of urinary calculus, ulceration of the bladder, and sometimes of diseases of the kidneys, is of course truly neuralgic, and it is probable that it may be relieved temporarily by the same treatment as that recommended for other kinds of neuralgia of the same region; but I need scarcely say that precisely because the maladies just mentioned may give rise to the pain in question, it behoves us always to bear them in mind when consulted concerning pudic neuralgia of any kind.

Crural Neuralgia is referable to morbid conditions of the lumbar segments of the spinal cord, for the whole surface of the thigh is supplied with nerves which emanate from one or more of the first four of those segments: branches from the ilio-inguinal, from the genito-crural, from the obturator, and from the anterior crural nerves, all concur to innervate the thigh; while to the outer half of it the whole of the external cutaneous nerve which arises from the second lumbar segment is distributed. Crural neuralgia is an affection to which women are peculiarly liable, and perhaps of all the aches and pains by which they are especially troubled, this and back-ache are their most common tormentors. Why it is so is probably obvious to most of my medical readers, but I shall revert to the question in a subsequent page.

Crural neuralgia is met with, Romberg says, "much more rarely than sciatica." By this statement, which is repeated by Copland and Downing, the eminent neuro-pathologist means, I presume, that what is ordinarily understood as typical neuralgia —viz, violent paroxysms of pain more or less distinctly periodical and intermittent, and unassociated with any obvious structural change at the seat of suffering; if so, of course the statement must be accepted as a summary of his experience of the relative frequency of the two maladies, an experience which may or may not be confirmed by that of other observers. But if aching of the thighs, not of a distinctly paroxysmal type from which many women suffer, and especially about the catamenial period, be accounted neuralgic, and I contend that it ought to be, then it is clear, I think, that crural neuralgia is very much more common than sciatica.

This malady may extend not only to the knee, but along the whole of the anterior and inner side of the leg and foot, as far as the great toe; it is also often associated, especially in women, with neuralgia of the pudenda; but it is frequently restricted to some one special region of the thigh. I was consulted recently respecting a case in which the integument innervated by the external cutaneous nerve seemed to be exclusively affected; and in this case pressure on the second lumbar spine, immediately over the centric origin of the nerve, produced considerable pain.

Sciatic Neuralgia, or *Sciatica*, may involve any or every part of the great sciatic nerve; it may therefore range from the hip to the toes, and may affect the whole of the lower extremity except those regions which are exclusively innervated from the lumbar segments of the cord. As justly observed by Romberg, "the traditional account of a pain following the course of the trunk of the nerve obscures the judgment." Until the pathology of neuralgia be correctly understood, both patients and physicians are likely to regard the part where the pain is felt as the seat of the disease; and indeed it may be admitted that, in cases of sciatica experienced in the broad expanse of the nerve lying between the tuber ischii and the great trochanter, certain post-mortem observations afford some countenance to this opinion. In this part of the nerve venous congestion, dilated veins, and evidences of great hyperæmia, as well as of inflammation itself, proceeding even to suppuration, have been observed and recorded. But in truth these phenomena are precisely analogous to those observable in many other cases of neuralgia. Neuritis more or less pronounced has often been noted; and the ordinary symptoms of inflammation at the seat of pain are, as has been shown, by no means rare accompaniments of the malady in whatever part of the body it

may appear. When they are present in the substance of the sciatic nerve their significance is the same as it is in other cases of neuralgia: they are consequences, not causes, of centric excitement which may have been induced in a great variety of ways.

Though in a certain proportion of cases the upper part of the sciatic nerve is mainly affected, pain in the different parts of the limb innervated by its several branches is much more frequently complained of. Sometimes the pain seems to course along the main trunk of the nerve; sometimes the whole limb is more or less involved in suffering—now one part and now another being the chief focus of pain. As in other regions the pain experienced is of all kinds, and of all degrees of severity; sometimes it seems deep-seated, sometimes superficial; in one case it is always felt at the same spot, in another it is surprisingly mobile and vagrant; one patient complains of stabbing or shooting pains coming on with the suddenness of an electric shock; another of horrid sensations as if the flesh were violently dragged or torn; a third describes his suffering as a dull, intermittent, or continuous aching; while a fourth is the victim of agonizing paroxysms, with intervals of complete relief. But perhaps the most common cases are those in which paroxysms of excruciating torment are separated from each other by periods of prolonged aching or uneasiness. So far as I have been able to learn, those cases in which violent paroxysms alternate with periods of complete freedom from pain are least frequent of all. Sometimes the attacks are not only very sudden, but owing, I suppose, to the great magnitude of the affected nerve, overwhelmingly violent. I have seen a patient who was quite free from pain, and who could walk perfectly well, become all at once the victim of terrific torture, just as if an overpowering electric current was being passed through the part; and immediately the previously strong limb was so paralysed as to be dragged along by the patient, just as in cases of hemiplegia. The pain in this case was mainly restricted to that part of the great sciatic nerve lying between the tuber ischii and the great trochanter, and on some occasions a small swelling—about the size of half a walnut—was distinctly perceptible over the broad expanse of the nerve where the pain was most poignant.

Tenderness of the parts affected is often observable. Among the cases hereafter described is one in which the heel was so tender that putting it to the ground often caused excruciating pain. Very slight pressure over any part of the painful region is in some cases almost intolerable; in others it produces no discomfort. Romberg speaks of the tenderness on pressure as being observable "especially at those parts where the skin immediately invests the bone, as at the knee, the head of the fibula, or the ankle."

Sometimes a peculiar sense of tightness of the skin is experienced. This feeling has been described to me as like to that which would be induced by fastening a metal plate very tightly round the limb. The pain is occasionally increased by movement of the limb. A man who recently consulted me stated that raising his leg or extending it rapidly was very painful. Romberg has noted this characteristic :—"Motion," he says, "especially of the leg and foot, is impeded and painful; the patient feels as if his muscles were fettered;" and he adds :—"Movement of the leg in bed, attempts to walk or stand, the concussion of coughing or sneezing, or straining in defecation, increase the pain of sciatica." Tactile sensibility is sometimes increased, sometimes lessened; but very often some degree of numbness of the painful part is observable. "Disturbance of motility," as Romberg remarks, "also occurs, such as contractions of the muscles, and especially spasms of the calves." The malady is said to be generally confined to one side; according to my experience, however, the bilateral form is less rare than is generally supposed. Three cases of this kind have come before me during the present year (1870).

Attacks of sciatica are commonly preceded and accompanied by aching in the loins; constipation or irregularity of the bowels; unduly frequent micturition; coldness of the lower extremities, especially of the knees; feelings of cold and heat, and even shiverings, following by feverish flushings at frequent intervals. Romberg says: "Sciatica is rarely complicated with other neuralgic affections." This statement does not accord with my experience. I have seen several cases in which the disease was associated with neuralgia in other parts of the body. The disorders just enumerated are prone to persist and become habitual in many cases of sciatica; and when the disease is peculiarly severe, a variable amount of paralysis evinced by weakness, numbness, and dragging of the affected limb, and sometimes by a liability to sudden and almost total, though temporary, loss of power in it,—not only occurs during the paroxysms, but remains in a more or less mitigated form as a sequela of the attacks. In these cases the muscles of the limb generally become flabby, and it may be notably atrophied.

Neuralgia of the Leg and Foot.—The ordinary neuralgic affections which occur in the leg and foot usually present no features requiring special comment. The pains are prone to be peculiarly vagrant or mobile, but according to my observations their most favourite seats are the heels, ankles, and toes. Sometimes the affected part of the foot is slightly swollen, red, and hot. Generally, no local change is observable; occasionally, the pain is associated with marked coldness of the feet. Pain in the sole of the foot, sometimes of an excruciating kind, has been described

by a few authors under the name of plantar neuralgia. I have frequently met with it as a fugitive malady, and once as a persistent and grave one. Although neuralgia of the leg and foot may be, and often is, restricted to some one spot, generally it is not so, but flies from part to part, and is associated with neuralgia more or less fixed and intense in the upper part of the limb. Of course, if the pains are seated chiefly along its inner side, we are justified in inferring that the lumbar segments of the cord are morbidly affected, and we may find tenderness on pressure of the lowest dorsal spinous processes; whereas, if the pain pervades principally the outer, posterior, or plantar surface of the limb, we know that the branches of the sciatic nerve, and therefore the sacral segments of the cord are chiefly involved. But there are doubtless many cases in which the nerves distributed to the leg and foot from both the lumbar and sacral portion of the cord are the media of pain at one and the same time.

Knee-ache. — Having already adverted to crural and sciatic neuralgia, each of which includes pains in the knee, as well as in the leg and foot, I lay myself open to the charge of repetition by troubling the reader with the following remarks on the special neuralgic affections of the knee. But as neuralgia of the knee and often of the leg and foot cannot be referred either to the anterior crural or to the sciatic nerve exclusively, it seems to me expedient to treat of these maladies separately.

The knees receive a very great amount of nervous influence, which reaches them through several channels and from different sources. Nearly all the segments of the cord, from the first lumbar downwards, contribute to their innervation, which, however, is mainly effected by the lumbar portion. Branches from the external cutaneous, the obturator, the anterior crural, and the internal saphenous nerves, as well as branches (usually three) from the great sciatic, cluster about and animate those important parts of the locomotive organs. It is, therefore, to be expected that the knees should especially become seats of suffering; and though knee-ache, or gonalgia, is not specially described in treatises on neuralgia, it is undoubtedly a neuralgic affection extremely common and extremely distressing; but as its victims are for the most part women who evidently hold it to be a part of woman's lot to bear an immense amount of pain, and therefore suffer in silence, little is heard of this form of neuralgia. As a matter of fact, however, the suffering incident to a large proportion of uterine maladies, especially those in which dysmenorrhœa is a prominent feature, is aggravated by aching of the knees; sometimes the pain, which is generally of a dull and diffused kind, pervades both alike; sometimes it is much more intense in one than in the other. Habitual sufferers from this

affection are mostly troubled with it at their catamenial periods, and remain wholly free from it during the intervals. There are, however, many cases in which one knee only is affected, and in which the pain recurs quite independently of the menstrual functions. Not long ago I was consulted respecting a case of this kind. The patient, a lady, suffered excruciating pain in one knee, in which there was no so-called "structural disease." But during the access of extreme pain, which was paroxysmal, with intervals of almost complete relief, the surface of the joint became hyperæmic, red, and tender, and the joint itself, though not thickened so as to lose its normal outline, was distinctly swollen and puffy. It also exhibited at different times an appreciable variation of temperature. It was hot during the paroxysms, and cool during the intervals. In many cases of the kind previously adverted to this variation of temperature is very striking; but in them the decrease rather than the increase of heat is most notable, the knees being as cold as are the feet of those patients who habitually suffer from coldness of the lower extremities. Very often when aching and coldness of the knees co-exist, these are associated with remarkable instability of circulation in the vaso-motor nerve centres, and a consequent habit of alternate shivering and flushing, which are inducible by astonishingly slight causes. If it be true that pain in the knees is possible only by virtue of a modification of condition in those nervous centres to which the nerves just enumerated are related, it is obvious that only such treatment as is capable of affecting the state of those centres is likely to cure the malady in question. Before determining in cases of knee-ache what treatment shall be adopted, care must of course be taken to distinguish pain which is ordinarily understood as neuralgia from pain in the knee originating in and reflected from disease of the hip-joint. But even the reflexion of this pain may, I apprehend, be either prevented or lessened by the proper use of the spinal ice-bag.

Sir Benjamin Brodie found that a fifth part of all the women who consulted him on account of pains in the joints were suffering from what he considered to be hysterical arthralgia. Of course, in many of these cases the knee was the part affected. Now I do not hesitate to express my decided opinion that in proportion as our knowledge of the physiology and pathology of the nervous system increases, that extensive region of disease called hysteria (an admirable disguise of conscious ignorance in the garb of occult wisdom) will be gradually appropriated by science, and allotted in separate sections, according to their special characteristics, to the different departments of intelligible neuro-pathology, so that at length hysteria, as a generic name of an extensive group of diseases, the true nature of which has until this day been

either unknown or misunderstood, will be banished from nosography. Hysterical disease of the knee-joint will be translated, —a morbid affection including hyperæmia of either the lumbar, or sacral segments of the spinal cord, or of the whole together. In the excellent article on Hysteria contributed by Mr. Savory to the "System of Surgery," edited by Mr. Holmes, the author describes "hysterical" disease of the joints; but in doing so he does but depict with admirable fidelity cases of neuralgia the pathology of which has been fully explained in the preceding pages. "A girl," he says, "will complain of severe pain and tenderness in the knee. The joint is fixed and immovable, and any attempt to move it elicits loud cries. But the tenderness is excessive and superficial, so that she complains more when the skin is touched than when the heel is pressed upwards. There is frequently, too, a tendency to spasm; but this is different from the painful and involuntary startings of the limbs at night in the real disease. Often also the leg is fixed in the extended position, whereas in real disease of the joint it is generally bent. However, to this rule there are abundant exceptions. The joint does not undergo any material alteration in size and shape, although there is often some degree of fulness—a puffy swelling. In some cases the enlargement may be considerable; but when this occurs it is due to some local applications which have been previously employed. The joint, and indeed the whole limb, is very subject to frequent variations in temperature. Thus, in the morning the limb may be cold, and of a pale or purple colour, as if there were scarcely any circulation of blood in it; while towards afternoon it becomes warm, and in the evening is actually hot to the touch, with the vessels turgid and the skin shining. Moreover, there is always a sense of weakness in the limbs, which after a while is partially due to the condition of the muscles consequent on their inaction. Then there is absence of constitutional symptoms. Although the sleep may be disturbed, and the patient watchful, there is not that almost entire absence of it which is so serious a feature in destructive disease of the joint. There is here a sufficient proportion of sleep for the necessities of the system. All this having existed without any material alteration for some time, with perhaps general debility or some local disturbance, proves the affection to be hysterical."

Cramp of the Leg and Foot.—The most general and characteristic pain experienced below the knee is that accompanying cramp of the muscles of the calf; and when it is borne in mind how considerable are the sources of irritation in the pelvic viscera, and that all irritation arising in them is liable to be reflected downwards through motor nerves originating in the lumbar or the sacral segments of the cord, as well as to produce conscious-

ness of pain referred to the peripheral extremities of other sensory nerves, the frequent occurrence of cramp in the muscles of the lower extremities is easily intelligible. But why the sural muscles are much more frequently affected with spasm than are the other muscles of the limb is, perhaps, not so easily explicable. I am disposed to believe, however, that the cause of the phenomenon lies in the fact that the immensely powerful muscles of the calf are less completely counterbalanced by antagonistic muscles than are any other considerable muscles either in the lower extremity or in other parts of the body. During sleep, when the action of the will is suspended, and the automatic or purely excito-motor nerve-force has free play, any morbid irritation converging in the sacral segments of the spinal cord is likely to be reflected on the several muscles of the limb in quantities proportionate to their size and the amount of their innervation. As the muscles on the anterior part of the leg are in respect to size and strength far inferior to those forming the calf, they cannot, unless we aid them by standing upright, maintain the foot equally balanced between them and the sural muscles, and thus at a right angle with the leg. There is a like but less remarkable preponderance of the muscles in the sole of the foot over those on its dorsal aspect. Indeed, this disposition of the muscles of the leg and foot is analogous to that of the muscles of the fore-arm and hand, the flexors of which far exceed their corresponding extensors in strength. Very often when the muscles of the calf are affected with cramps, those of the sole of the foot are also; and sometimes the latter are the exclusive seat of violent and intensely painful cramp. Seeing the great relative strength of the flexors of the wrist and hand, and that notwithstanding this fact cramp rarely occurs in those muscles, the explanation I have suggested of the frequency of cramp in the muscles of the calf and of the sole of the foot seems to be invalidated. It must be borne in mind, however, that the lower segments of the spinal cord which govern the lower extremities are more completely automatic than are those which preside over the upper extremities, and that the cramps in question generally come on during sleep. Now, obviously, when the will is quiescent, those parts of the spinal cord which are most capable of acting independently, as the involuntary nervous centres do, will do so on very slight provocation; and this, in my opinion, is the reason why during sleep that part of the cord innervating the lower extremities are most prone to independent action, and why, therefore, cramp, which rarely occurs in the arms, occurs very often in the legs.

The precise mode in which the terrible pains incident to cramp are produced is, in so far as I am aware, unknown, though as it seems to me, it is easily conceivable. When dense fibrous tex-

tures like to that of the sclerotic coat of the eyeball, for instance, are inflamed, they are excruciatingly painful, and the intensity of the pain in these cases is usually explained by saying that as the affected textures are unyielding, the swelling associated with their inflammation causes the nerve filaments distributed to them to be pressed upon from every side, and that this abnormal pressure causes the extreme pain in question. This explanation is probably as true as it is simple; and as the textural conditions out of which the pain arises are somewhat analogous to those of cramp, the explanation of the origin of that pain countenances the idea I expressed concerning the source of the pain incident to cramp, when adverting to the so-called neuralgia of the portio dura. When muscles are intensely contracted, they become, like fibrous textures, dense and hard, and it seems inevitable that they must then exert great and abnormal pressure on the nerves pervading them, and thus originate violent pain exactly as the pressure incident to inflammation of fibrous textures is said to do.

CHAPTER VI.

THE SEVERAL KINDS OF VISCERAL NEURALGIA.

Chest Ache.—Writers on neuralgia usually advert to neuralgic affections of the walls of the chest under the names of pleurodynia, infra-mammary pain, and intercostal neuralgia, but, excepting angina-pectoris, neuralgic affections of the thoracic viscera are not often systematically or distinctly adverted to. They are, however, in my opinion, of frequent occurrence, and it is more vitally important to detect and arrest them than any other forms of the malady. No physician who carefully studies the variations in the vascular condition of the thoracic integuments of persons in whom the nervous system is liable to disorder by slight causes can fail to be struck by the fact that the surface of the chest, and especially of the mammæ, exhibits great and often rapid changes of temperature, frequently associated with more or less congestion, and with tenderness, considerable pain being produced by slight pressure. In such cases the patients frequently complain of a dull aching pain within the chest, generally beneath the clavicle —sometimes on one side, sometimes on both. But the most careful examination by means of percussion and the stethoscope fails to elicit any evidence of *structural change*—a phrase denoting, as ordinarily understood, change of a more or less gross and palpable character; but though the ordinary method of physical exploration of the lungs fails in the cases in question to reveal any structural change, I have no doubt whatever of its existence, and feel assured that it consists in the initial stage of conditions too often ultimately appreciable by the stethoscope—viz., disordered nutrition in the form of anæmia, hyperæmia, or congestion. Those primary vaso-motor nerve centres which preside over the blood-vessels of the chest walls are also intimately related functionally to those of the lungs themselves; and careful observations many times repeated have convinced me that the temperature and vascular condition of the thoracic integuments at any given time are reliable indices of the state of circulation within the nutrient vessels of the pulmonary tissue.

Persons complaining of pain in the chest, but in whom no structural cause for it can be found, often exhibit those irregularities of circulation, and consequently of temperature, in the thoracic integuments which I have just mentioned; and I have

satisfied myself that those irregularities and that aching of the lungs occurring simultaneously, are induced by nervous agency: the morbid influence, originating in various remote causes—sometimes within the body, sometimes without—is reflected by the vaso-motor nerve centres on to the blood-vessels, causing different disorders of the circulation; and, not infrequently I apprehend, sensory nerve centres related to the lungs are rendered hyperæmic in the manner already described, and become productive of pain referred to some part of the chest. I am acquainted with three cases in which sewing speedily induces chest-ache, and with another in which playing the piano does the same.

When adverting hereafter to uterine neuralgia, I shall mention some analogous facts illustrative and confirmatory of what I have just said. The character of the pain experienced in these cases differs greatly in different persons. It is sometimes dull and peculiarly depressing, accompanied with a feeling as if the chest were constricted, or subject to powerful external pressure; sometimes it is gnawing or burning, and in one case the patient described it to me as if a hot iron rod were fixed within the affected part. A copious secretion of bronchial mucus, often so copious as to be fitly designated bronchorrhœa, is a not unfrequent symptom in such cases, and even pulmonary hæmorrhage may sometimes occur. Patients suffering in this way are of course apprehensive that their sufferings denote the existence of grave structural injury within the chest, but their ordinary medical attendants finding no physical signs of pulmonary disease, and finding, moreover, that the pulmonary pain is occasionally associated with acute pain in the arms—now in one arm, now in the other, and sometimes in both—ascribe the symptoms in question to rheumatism or hysteria. But notwithstanding the assurances of the physician that there is no cause for anxiety, the patient continues to feel the reality of the pain complained of; and if the vaso-motor nerve centres are extensively and persistently irritated so as to become permanently hyperæmic, there will be slow wasting of both the thoracic integuments and of the lungs themselves. The lungs will contract, the chest walls will sink inwards, the voice will be more or less suppressed, the strength will decline, and the symptoms of pulmonary consumption may be so well simulated, that both the patient and her friends [in these cases the patient is generally feminine] feel assured that she is the victim of that disease, notwithstanding the fact that the several physicians who may have been successively consulted declare that her lungs contain no tubercular deposit. Indeed, I believe that such cases do occasionally prove fatal, and I entertain no doubt but that actual phthisis is often inaugurated by, and developed out of, the morbid conditions here described.

Angina Pectoris.— Of all the various and agonizing forms which neuralgia assumes, this is at once the most terrific and the most fatal. It manifests itself differently in different cases, but in all, or nearly all, certain characteristic and exceedingly impressive features are observable. An apparently healthy man, probably over forty years of age, may be walking rather more briskly than usual, or may be going up-stairs, when he is suddenly seized with a dreadful and indescribable pain usually referred to the heart as its chief seat, and accompanied by a sense of violent constriction of, or of pressure on, the chest. Generally while the paroxysm lasts the patient's anguish is horribly severe, and, filled with terror, the sufferer feels as if in the very agony of death. Indeed many patients have the impression, as Sir Thomas Watson observes, "that to continue the exertion which has produced the attack—to stir another step—would be fatal." And yet as soon as the attack has subsided its victim is left much in the same condition as he was before he suffered it, and in many cases may quickly afterwards resume his walk or usual occupation as if nothing had happened. In many other cases, however, the paroxysms are so easily provoked, that the patient is compelled to be conscious of his every movement, and always assiduously on his guard. But in some cases no amount of care suffices to ward off attacks if the patient should venture on any muscular exertion. Trousseau mentions some striking instances of this kind. One gentleman induced oppression in the chest by the least active exercise, even by signing a number of official documents in quick succession; another, "if he happened to walk up the least ascent," says that eminent physician, "was instantly seized with pain, and was compelled to stop. He had just come from Lyons on the day when he consulted me. He had travelled all night, and as he came out of the railway carriage he had to walk a few steps about the station to get a cab. Although he walked quietly, he was seized so violently that he had a kind of fainting fit, and was obliged to sit down in the mud." Besides the feeling of impending death experienced during severe paroxysms, violent pains often extend over the base of the neck, the left mammary region, the left shoulder, down the left arm, beneath the shoulder blade, backwards to the spine, and sometimes, especially in very severe attacks, along the right extremity also. Indeed in some cases the pain spreads still more extensively. In a case mentioned by Trousseau "the pain started from the pre-cordial region, and radiated from it to the base of the chest, producing there a sensation of constriction which the patient compared to that which might be caused by an iron girdle tightened with force. It then spread to the loins, and ascending towards the cervical region, attacked the left arm, and extended into the very tips of the

fingers." As a rule, however, the pain is mainly restricted to the left side. In some cases the region of pain in the arm is curiously limited, stopping short at some special point, about the insertion of the deltoid muscle, for example, or at the elbow, or at the wrist. Occasionally, the pain begins in the left upper extremity, and seemingly advances to the heart. In one of Trousseau's cases "the pain began at first in both shoulders, spread rapidly to the tongue, the neck, and then to the arms and chest;" in another "it began with an acute pain in the muscles of the left arm, and radiated from there towards the chest, a little above the heart." Sometimes prickling and numbness of the limb down to the tips of the fingers are also experienced. Vertigo, or fainting, is an occasional concomitant. In his general description of the malady Sir Thomas Watson says: "The patient is on the very brink of fainting, nay, does at length faint irrecoverably;" but this expression is, I think, rather apt to mislead. We understand by fainting an arrest of cerebral action owing to a deficient supply of blood to the brain; and in the majority of cases of angina pectoris this does not occur. In many cases the intellect remains unimpaired and quite clear throughout the paroxysm. Moreover, in a certain proportion of cases the disease does not prove fatal, and therefore the words—"nay, does at length faint irrecoverably," depict it in even darker colours than experience justifies. It seems to me that in nearly all the cases in which the mental functions are disordered during an attack, the nature of the disturbance is much more nearly allied to that characteristic of the short fits of epilepsy than to that of syncope.

The aspect of the patient in the majority of cases is one denoting consciousness of extreme suffering and of extreme danger: he looks terror-stricken, and the spectator is filled with apprehension as to the result of the attack. No person who has once witnessed a severe paroxysm of angina pectoris is likely to forget the fear-inspiring appearance of the patient. The countenance generally becomes suddenly pallid, then gradually turns more or less red, and the features are almost invariably contracted and anxious-looking; the patient thinks he is about to be suffocated; different patients assume different attitudes, that which is least painful being no doubt instinctively chosen in each case. Along with the tingling or numbness, or both, of the upper extremity already mentioned, there is commonly a remarkable disturbance of the circulation visible in the hand and arm as well as in the face. The skin is apt to become excessively pale and cold, and almost immediately afterwards to change to a red, blue, or livid tint. When the attack subsides, a reaction of the local circulation, inducing turgescence, heat, and perspiration, is sometimes observable. Moreover, exceptional cases are recorded, in which one

patient thinks his hand swells, another experiences a congestion of the mucous membrane of the nose, another is obliged to micturate, and another has an abundant secretion of intestinal gas during each attack. As a general rule the sense of suffocation which is experienced is not accompanied by any appreciable disorder of respiration. When breathing is interfered with, it usually is so only by the voluntary action of the patient, who fears to breathe lest he should increase his suffering. Paroxysms are prone to occur in the night, and even when the patient is asleep, and in some rare cases they exhibit a regular periodicity like those of ague. In the worst cases they increase in frequency and severity until at length they prove fatal.

The foregoing description fairly represents the chief features of angina pectoris; the phenomena differ, however, exceedingly in different cases, and the disease presents itself in all degrees of intensity. The truth of this remark will be well shown by the two following cases reported by Trousseau:—"A gentleman, sixty years old, who had been suffering from diabetes about six years, was also afflicted with angina pectoris, which first attacked him shortly after the sugar was detected in his urine. The paroxysms recurred about one o'clock each morning, and began with an acute pain in the left arm, and then extended to the chest; it went on increasing progressively for an hour or two, then diminished slowly, and disappeared towards morning. . . . Although the pain was very acute, it did not prevent him from drawing in a deep breath at will, and he had never had a sensation of suffocation." This slow process and decline of the attack, and the absence of the sense of suffocation, are remarkable in this case, while the next is scarcely less remarkable, because while it presented symptoms showing the affinity of the malady with ordinary angina, the patient, a young married lady, had no actual pain during the attacks. For the space of four years she had only excessively violent palpitations, without any sensation in the arm, and then during four subsequent years "the palpitation was accompanied by painless numbness of the left arm, which compelled her to drop whatever she might be holding in her hand. These symptoms recurred whenever she took a little more active exercise than usual."

The age of a sufferer from angina pectoris is rarely less than forty. The disease is especially notable for attacking persons of middle and advanced life. The case of the young lady just mentioned may be fairly adduced as one of those exceptions which tend to prove the general accuracy of this remark; for though her malady exhibited indubitable affinities with angina pectoris, it was not characterised by any of those striking features which especially distinguish that disease, and which, in fact, originated its name.

Men are said to be much more liable than women to attacks of this disorder: of the eighty-eight sufferers, whose cases were collected by Sir John Forbes, only eighty were of the male sex. My experience leads me to doubt, however, whether men are attacked much more frequently than women, and Trousseau says,—"I do not think that it has been proved that males are more subject than females to this singular affection."

The exciting causes of attacks of angina pectoris are various, and differ in different persons; and when once the disease is really developed, the causes capable of inducing a paroxysm are astonishingly slight. Muscular exertion is one of the most frequent of these causes; the more violent it is, the more likely it is, of course, to produce an attack; but, in some cases, almost any muscular effort will induce it. Walking briskly very often does so, walking up hill or up stairs does so still oftener, and still more often an attack is brought on by walking or running against the wind. In fact, muscular effort of almost any kind will, in some cases, act as an exciting cause. In one case already mentioned walking in the most careful and quiet manner, and in another even the effort of signing a number of documents in quick succession induced a paroxysm. Mental emotion is especially notorious as an exciting cause. The celebrated John Hunter lost his life, as is well known, by an attack brought on by a fit of anger when he was at St. George's Hospital, where he expired. Indigestion or flatulency not unfrequently produces a paroxysm in some cases; and, indeed, it may be stated as a general rule that any cause operating so as to produce disturbance of the nervous system is likely to bring on an attack.

The pathology of angina pectoris has given rise to many ingenious speculations and elaborate hypotheses; and, so far as I am aware, none of the latter are wholly satisfactory. Sir Thomas Watson is of opinion "that the seat of the disease is the heart, or the aorta, and that it consists in some structural change." He discredits the idea that the disorder is a neuralgic affection "because the paroxysm is excited by such causes as are especially calculated to disturb the natural action of the heart, bodily exertion, and mental emotion;" and because "the disease is so very frequently fatal." I confess, however, that these reasons do not seem to me cogent: attacks of indubitable neuralgia are not unfrequently excited by bodily exertion and mental emotion; and the objection that angina pectoris is so often fatal, whereat neuralgia is not, is at once disposed by the consideration that the fatality of morbid actions is mainly dependent on the nature of the function of the organ affected. For example, acute inflammation of the skin is rarely attended with any serious consequences; but inflammation of the mucous membrane of the

trachea, in the shape of croup, is very frequently fatal; and, in like manner, a neuralgic, or spasmodic affection of superficial parts, may be unattended with danger, while analogous affections of the viscera, and especially of the heart and aorta, may be remarkably deadly. The theory which seems to commend itself most especially to Sir Thomas Watson, is that which explains the disease "by supposing that the blood, whenever its movement is accelerated by exercise or otherwise, arrives at the heart faster than it can be transmitted onwards, and accumulating in its cavities, painfully distends them." This explanation is incapable of proof, while, on the other hand, certain weighty facts are decidedly opposed to it. A vast number of persons who are extremely prone to strong emotion, and, as a consequence, to sudden disturbances of the circulation and of the heart's action, are never attacked with angina pectoris; again, thousands of persons having notoriously weak hearts, which may be imagined to facilitate functional disturbance, do not have their hearts painfully distended so as to induce the disease in the manner supposed; while, on the contrary, persons with robust hearts do sometimes die of angina pectoris; and in cases of chloroform inhalation, the right heart is abnormally distended, but I have never heard that those who inhale chloroform evince or experience effects like to those experienced by sufferers from angina pectoris.

Over distension of the heart's cavities is, by other pathologists assumed to be only a preliminary stage in the production of the disorder, such distension being imagined to induce "the immediate cause of the paroxysm," viz., "a sudden impediment to the *coronary* circulation of the heart; and particularly to the return of the blood by the coronary veins."* This theory seems to me untenable because, while like the preceding one, it is incapable of proof—it is open to the fatal objection that *post-mortem* examinations reveal the existence of serious impediments to the coronary circulation in the shape of ossification of, or of atheromatous deposits in, the coronary vessels of a great number of persons who never experienced angina pectoris. This objection is held to be a valid one by Dr. Stokes, who regards the disorder as "but the occurrence, in a defined manner, of some of the symptoms connected with a weakened heart." This opinion is directly confirmed by Latham, Walshe, and, among Continental writers, Bamberger (quoted by Eulenberg), who consider the essential feature of angina pectoris to be a spasm of the heart or aorta, or of both. The remarks which I have already made at the end of the chapter, on the pathology of neuralgia generally, will have already assured my readers that I look on the opinion

* Atkin's Science and Practice of Medicine, Vol. II., p. 116.

of the authorities last quoted as substantially correct. Assuming it to be so, there still remains for consideration the important question,—by what agency is the spasm produced?

Arguing analogically, we are led inevitably to the conclusion that the muscular tissue of the heart and aorta assumes a spasmodic condition only when the nervous energy causing it to contract is morbidly excessive. We know that the heart itself is abundantly innervated—not only by the ganglia imbedded in its own substance, but from various extraneous and complex sources, both cerebro-spinal and sympathetic. The diversity of origin of this powerful nervous influence will probably always render it impossible for us to trace the special source and course in any given case of the morbid nervous force productive of angina pectoris, but it greatly increases the liability of the heart to dynamic disturbance, and affords a complete explanation how it is that the disease in question manifests itself in patients of extremely diverse constitutional conditions, and that its paroxysms are induced by a great variety of exciting causes. The tumultuous forces of violent mental emotions are flashed down the spinal cord, and spreading laterally through the ganglia of the sympathetic cause an instantaneous disturbance of the otherwise orderly nervous effluence to the heart from the cardiac plexuses; modifications, chiefly by way of acceleration, of the pulmonary circulation, caused by muscular exertion, produce, apparently, in the predisposed, vaso-motor reflex actions on the heart and aorta, and consequently preternatural contraction of those organs; reflex actions of a like kind, and producing like effects, may also proceed from the stomach and bowels, or even from the pelvic viscera when disordered; and, *à fortiori*, when the heart itself is diseased, or when an aneurism of any of the great vessels in the thoracic cavity exists, it is likely that in either the one case or the other the disorder will produce a reflex spasmodic influence directly on the heart or aorta, or on both together. It is therefore easily intelligible how it comes to pass that angina pectoris occurs with especial frequency in cases of ossification of the coronary arteries or of thoracic aneurism, although neither of those structural injuries is necessarily either an efficient or exciting cause of the malady. In short, the paroxysms of angina pectoris like those of epilepsy can only occur through the intervention of the nervous centres, and the exciting causes of the one disease as of the other can only operate through the agency of those centres. Moreover, I apprehend that just as there are cases of epilepsy which, having no assignable cause, are called idiopathic, so there are probably many cases of angina pectoris, the essential nature of which consists in an inherent constitutional predisposition to the malady existing aboriginally in the nervous system, and expressing itself

whenever that system is especially irritated or excited by causes of any kind operative primarily in any part of the body.

I venture to believe that this view of the nature and genesis of angina pectoris will commend itself, by virtue of its simplicity and vraisemblance, to the majority of pathologists, and that on further examination it will be found to afford the only satisfactory explanation of the several morbid phenomena above mentioned as associated with the principal disease. The sudden onset of the paroxysms, the rapid recovery from them, and the ease with which they are induced are all at once explicable by the doctrine now explained. If, as that doctrine implies, there is an essential analogy between angina pectoris and epilepsy, the reader who bears in mind that the terrific morbid phenomenon consisting of a convulsive epileptic fit may occur without leaving any appreciable trace in any part of the organism, will have no difficulty in understanding how a paroxysm of angina pectoris may come on without any demonstrable or even assignable cause, and may pass off, leaving its victim seemingly no worse for the suffering which has been temporarily experienced. Assuming that each of these attacks is a consequence, and expression of functional disorder of some part or parts of the nervous centres, we perceive at once how it is that the morbid phenomena associated with the principal disease are so different as they are in different cases, and how those several phenomena are produced. The varieties in respect to the intensity and extent of the pain experienced are obviously dependent on the character and extent of the nervous centres involved in morbid action. If those centres are mainly ganglionic, the pain will be mainly restricted to the region of the heart itself, and will originate in a spasm or cramp of the involuntary muscular fibres of the heart, or of the aorta, or of both, in the manner already explained. If, on the other hand, the nervous centres primarily disordered include segments of the spinal cord as well as ganglia of the sympathetic, there will not only be the peculiar symptoms essentially distinctive of angina pectoris, but also the pains which are often experienced in the neck, mammary region, and in various parts of the upper extremity, from the shoulder to the tips of the fingers, especially on the left side, and which sometimes invade a large part of the body, including even the lower extremities. Moreover, when the spinal cord is thus affected, those sensations of formication, tingling, and numbness, of which, in many cases, patients complain, may also be experienced, although anæthesia may, indeed, be produced by morbid conditions of the sympathetic, resulting in local arterial contractions. And these contractions are, of course, the immediate cause not only of the vertigo, or

faintness sometimes experienced, but also of that pallor, or lividity and coldness of the skin, which are often observed. In those recorded cases in which swelling of the hands and of the nasal mucous membrane occurred, it is to be presumed that the disorder extended to those nerve centres governing the nutrition of the parts affected, while in those instances in which a rapid generation of flatus, and the necessity of micturition are concomitants of an attack, the central disorder extends downwards along the splanchnic nerves, and thence through the medium of the celiac, renal, and inferior hypogastric plexuses, diffuses its irritative influence over the bowels, kidneys, and bladder, thus causing the generation of flatus and the secretion and expulsion of urine. The fact that the paroxysms of angina pectoris, like those of epilepsy, occur more frequently in the night than in the day time is alone explicable by the hypothesis that the disease is symptomatic of morbid hyperæmia of the automatic nervous centres functionally related to the affected organs—a condition especially liable to be induced during sleep; and this hypothesis also affords the best explanation of the tendency to periodicity, which is often a notable feature of this disease, and which is also a connecting link between it and epilepsy. Finally, I may observe that the same hypothesis affords a complete explanation why it is that the presence of thoracic aneurisms and atheromatous deposits in, or ossifications of, the coronary arteries seem to operate in some cases as adequate causes of angina pectoris, while in other cases their existence is unaccompanied by even the slightest trace of this malady. Obviously, if its real seat is in the nervous centres, and especially in those presiding over the action of the heart and thoracic blood-vessels, the possibility of its origination will be mainly dependent on the character of the excitability of those centres: if that excitability is so great as to be fairly called morbid, then a thoracic aneurism causing irritation by pressure as well as by circulatory disturbance, or ossified coronary arteries causing irregular nutrition and function of the heart, may easily provoke those morbid reflex actions constituting angina pectoris; whereas, a robust and stable nervous system, resisting the disturbing force of morbid impressions with the strength of genuine health, may be exposed to the irritating action of the agencies in question without suffering that functional perversion productive of the disease.

Gastric Neuralgia (Gastralgia, Gastrodynia, Stomach-ache). Systematic writers on neuralgia usually treat of gastric neuralgia and enteric neuralgia separately; but these affections are so intimately related, and so often merge into each other, or present themselves together, that though it may be expedient to describe their symptoms separately, it will, I believe, be best when advert-

ing to their pathology to consider them together. I shall accordingly adopt this plan.

The chief feature of gastric neuralgia is, of course, as its name implies, pain—stomach-ache. But according to conventional phraseology, this pain can only be rightly called neuralgia when not associated with any assignable organic cause—such, for example, as inflammation, ulcer, or cancer. It may, however, be associated with grave and various disorders, which are called functional. The onset of the pain is in some cases very sudden, in others it is gradual, and not infrequently may be preceded by a sense of oppressive or prolonged *malaise*. Often the pain is of a violent crampy kind, felt, as the patients say, "at the pit of the stomach," and frequently extending to the back. In one case the pain causes the patient to seek relief by bending the body on itself; in another it is described as a dreadful burning sensation; one patient complains only of a dull weary aching, while another is tormented with acute and suddenly overwhelming agony. In the great majority of cases the pain seems to radiate laterally and backwards, affecting especially the regions beneath the shoulder-blades, and still more especially that of the spinal cord. In some cases pressure over the epigastrium gives temporary relief; in others there is marked tenderness of this part; so that pressure on it is intolerable. But indeed gastric neuralgia presents itself in such various aspects in respect to its nature, duration, onset, subsidence, and accompaniments, that no single description of it can be fairly termed typical; an adequate conception of it can only be obtained by careful observation of a large number of the cases in which it is a distinctive feature. When the pain is very severe, it is liable to be accompanied with a sense of sinking and faintness, and is usually associated with pinched features, coldness of the extremities, and a feeble, wiry—sometimes irregular—pulse. Most generally the pain is connected with the ingestion of food, and is relieved when the stomach is emptied either by vomiting or by completion of the digestive process; but some persons suffer most when the stomach is empty, and experience partial relief at all events by taking food. Occasionally the pain is unaffected by either the presence or absence of food. In those cases in which pain comes on when food is taken, the recurrence of the malady is of course due to an obvious exciting cause; but apart from any assignable cause the pain often recurs in paroxysms with intervals of complete relief, and in some cases these paroxysms recur with remarkable regularity in respect to time.

A special form of gastralgia is that characteristic of what is popularly designated *Heart-burn*. This common disorder of the stomach consists of gnawing or burning pain and tenderness at the epigastrium, accompanied with acid or bilious eructations,

which are peculiarly irritating along the throat and fauces. In chronic cases the eructed fluids are often considerable, and have an extraordinarily horrid taste. In severe cases extreme depression, faintness, and that aspect of the countenance distinctive of gastric or mesenteric pain form part of the disorder.

The most notable concomitant of almost all kinds of gastric, as well as of enteric, neuralgia, and a source of extreme distress, is flatulent distension of the stomach and bowels. The swelling of the abdomen from this cause is often extraordinarily great, and in many cases comes on with striking rapidity. In a subsequent chapter the nature, causes, and treatment of this affection will be fully considered.

Vomiting, though according to my experience a less frequent concomitant than flatulence, is a common one, and is often remarkably intractable. Moreover, if not arrested, it is apt to become increasingly severe and frequent: whereas in the early stages of the malady the patient may vomit only when pain is present, or immediately after food, in the latter a condition of gastric hyperæsthesia so extreme becomes developed as to result in vomiting with the most distressing frequency, wholly irrespective of the presence of pain, or of food in the stomach. The gastric mucous membrane becomes excessively active, and the painful retching results in the ejection of large quantites of glairy tenacious mucus after the ordinary ingesta have been thrown up. This condition, if persistent, is usually considered symptomatic of chronic gastritis. In those cases in which vomiting does not occur, nausea, dislike of food, or perverted and capricious appetite are very apt to be experienced.

The bowels are usually constipated; sometimes, however, they are habitually relaxed, and sometimes the two states, seemingly without any intelligible cause, alternate with each other.

Enteric Neuralgia (Enteralgia, Colic, Belly-ache) consists of severe cutting, tearing, or griping pains, sometimes accompanied with more or less retraction of the abdomen and spasm of the abdominal muscles, and sometimes with great distension of the whole cavity, the walls of which become extraordinarily tense and hard. As in gastric neuralgia the pain is of all degrees of intensity, duration, and frequency of recurrence, and when severe is associated with a peculiarly sunken and rigid aspect of the countenance, the cheeks and forehead being usually cool or cold. The extremities, particularly the lower, are apt to be cold; indeed in a large proportion of cases the feet are habitually cold. The pulse may be of average frequency, but during the attacks it is usually thin, feeble, and unsteady, or even intermittent.

The bowels are almost always sluggish and constipated, and the

fæces are often moulded into a number of small round hardish pellets. Occasionally, however, smart attacks of diarrhœa are experienced; and there is often considerable tenesmus. The urine varies remarkably from time to time both in quantity and quality: it is sometimes extremely scanty or even suppressed, and then again it becomes surprisingly copious; for a few days together it is pale and limpid, and then during a like period perhaps it becomes high coloured and turbid. When the patient is a woman there is almost sure to be some grave menstrual disorder, most commonly dysmenorrhœa; leucorrhœa, also, is a scarcely less frequent accompaniment.

As already intimated, gastric and enteric neuralgia frequently co-exist; or, in other words, the malady ranges over a large part of the alimentary tract, the gastric symptoms, however, being predominant in one case, the enteric in another. But in either case headache and backache are pretty sure to be present in more or less intensity as very frequent, although not inseparable companions of each of those disorders. Moreover, the headache in question is usually though not invariably the result of cerebral anæmia, the forehead in such cases being decidedly cool, or even remarkably cold; cerebral action is feeble; there is a notable deficiency of mental energy; and the patient is apt to be despondent, or melancholy.

The exciting causes of these neuralgias are especially numerous, and comprise almost every agent capable of disturbing the orderly action of the automatic nervous centres. Among the most generally recognized causes are the following: The suppression of habitual discharges—the menses or hæmorrhoids, for example (the sudden cessation of the menses at the period when the menstrual function is declining is an especially frequent cause); suddenly suppressed perspiration; excessive indulgence of the sexual appetite; masturbation; intestinal worms—especially tape-worms; the gouty diathesis; malaria; over-fatigue from walking; disease of the heart; anxiety; fright; any violent mental emotion of a painful kind; excessive mental toil.

The pathology of the two forms of neuralgia just described involves several important and peculiarly interesting questions which hitherto have been answered very differently by different writers. Romberg describes "Gastrodynia" under the title—"Hyperæsthesia of the Vagus," and therefore assumes, of course, that the pneumogastric nerve is the chief, if not the sole, sensory nerve of the stomach. Now I am disposed to doubt the correctness of this assumption; and as a right apprehension of the facts in respect to the sensory innervation of the stomach is an indispensable preliminary condition of rational treatment of the maladies to which it is subject, it is incumbent on me to state my

reasons for departing from the doctrine taught by the eminent neuro-pathologist just mentioned.

It is possible, of course, that the stomach and brain may be correlated by two distinct sets of afferent or sensory nerves, one set being exclusively restricted to the rôle of excitors in the performance of those automatic or excito-motor actions of the stomach which consist not only in the fulfilment of its normal functions, but in the perverted actions of its secreting cells, and in vomiting, while the other set is alone concerned in conveying from the stomach to the sensory ganglia those impressions which produce a consciousness of pain. But while admitting the possibility of the two sets of sensory nerves just supposed, I wholly disbelieve in the existence of more than one set; and without giving reasons for my disbelief, I may add that it is generally shared by physiologists. This being the case, it will be only necessary for me to show that the nervous track by which the stomach is usually incited to vomiting is not along the branches of the pneumogastric, but along that of the splanchnic nerves and spinal cord, in order to prove that sensory impressions from the stomach, productive of the consciousness of pain, are also *mainly* conveyed through the ganglionic centres, and thence along the spinal cord, and not, as Romberg and other writers affirm, through the pneumogastric. As I have already attempted to elucidate this point in the chapter on "The Physiology of Vomiting," contained in my book on "Sea Sickness," I shall repeat here the following observations, extracted from that chapter :—

"The question,—What constitutes the nervous agency by which vomiting is induced? is very difficult to answer. Dr. Marshall Hall thought the answer very easy: assuming the medulla oblongata as the 'centric organ of expiratory effort,' he states that the excitor nerves, irritation of which produces vomiting, are the Faucial branch of the Trifacial; the Gastric, Renal, and Hepatic branches of the Pneumogastric, and the Intestinal or Uterine branches of the spinal nerves. The corresponding motor nerves by which the impulses originated in the medulla oblongata by the excitors are conveyed to the expiratory muscles concerned in the act of vomiting are, as he says, 'the spinal nerves distributed to the intercostal and to the abdominal muscles.' The part played by the pneumogastric as an excitor of vomiting, is by no means so clear in fact as it appeared to Dr. Marshall Hall. The remarkable experiments of Dr. John Reid prove conclusively that after the vagi have been completely severed, all communication by them between the stomach and medulla oblongata being thus rendered impossible, the stomach is far more excitable than before: during several days after the operation it ejects whatever food is put into it, almost as soon as it is taken. The same experiment, several

times repeated on different dogs, was in each case followed by the same result.* From this the conclusion is inevitable that the stomach can be excited to vomiting by substances within itself, independently of the pneumogastric, and that though this nerve may perform the function of an excitor, one at least of its most important functions is an inhibitory one—viz., that of so controlling the stomach during digestion as to restrain it from ejecting its contents. It is remarkable that though Dr. Reid published the results of his experiments in 1839, Dr. Marshall Hall takes no notice of them in the section on vomiting contained in his work on 'Diseases and Derangements of the Nervous System,' published in 1841.

"Dr. Reid's experimental results are in striking accordance with the conclusion to which I have been led, and the accuracy of which has been confirmed by a large experience in the medical treatment of various kinds of sickness—viz., that in the majority of cases the reflecting centre from which motor impulses productive of vomiting are transmitted to the stomach, is not the medulla oblongata, but the spinal cord. Cerebral disorders, and notably affections of the medulla oblongata, are often undoubtedly associated with vomiting; but it seems to me that the function of the encephalic centres in relation to the stomach, is chiefly one of control or co-ordination of the agents more immediately concerned in carrying on its wondrous processes; while those agents themselves consist of certain ganglia of the sympathetic, and of nerve-cells forming part of the grey-matter of various segments of the spinal cord. When the brain is disordered, the disorder is commonly propagated to the so-called automatic nervous centres presiding over the nutrition and other organic functions of each segment of the body: but if such disorder expresses itself, *inter alia*, in tonic spasms of the arteries nourishing the bowels or the extremities, causing in the one case constipation, and in the other

* In the Zeitschrift für rationelle Medicin, edited by Henle and Pfeufer, vol. xvi. p. 432-3-4, is the following summary of experiments, consisting in division of the Vagi, by Ravitsch and Schiff:—

"*Ravitsch* fütterte je zwei Hunde, zwei Frösche mit der gleichen Speise, durchschnitt dann bei einem der Thiere beide Vagi am Halse und untersuchte nach 24 Stunden die Mägen. Bei den gesunden Thieren war der Magen fast oder ganz leer, bei den operirten fand sich Alles oder der grösste Theil des Eingebrachten noch in Magen vor."

"*Schiff* leugnet, gestützt auch auf neue Versuche mit Benutzung von Darmfisteln dass nach der Durchschneidung der Vagi bei Hunden, welche *Schiff* unter dem Zwerchfell resecirt, keine Speisen mehr aus dem Magen in dem Darm befördert würden; der Magen entleere sich nach der Vaguslähmung, und zwar nicht durch den Reiz der Nahrungsaufnahme dazu veranlasst in dem Sinne, wie es *Ravitsch* für Herbivoren annimmt. Magenbewegungen erhielt *Schiff* auch vom Sympathicus aus; der Vagus sei also nicht der einzige motorische Nerv des Magens, wie R. wollte."'

obstinate coldness of the limbs, we do not therefore deny that the arteries in question are governed by the ganglionic nervous centres related to them, and immediately affirm, on the contrary, that without the intervention of subordinate agents their diameters are directly regulated by the brain. It is well known that the bulging of the spinal cord, where the nerves are given off to the upper and lower extremities, corresponds to an amount of vesicular matter or reflecting cells far greater at those parts than exists in any other segments of the cord, and that these cells preside automatically over the actions of the limbs, which therefore do their work, as in standing or walking, for example, with a very slight degree of superintendence from the brain. That superintendence is, however, essential. But because it is so we do not refuse to recognise in the spinal centres in question the proximate causes of those muscular actions constituting standing and locomotion. These cases are, in my opinion, exactly analogous with that under consideration; and the more closely the facts in question are scrutinized, the more completely this opinion will, I believe, be justified. Dr. Reid has demonstrated that in cases where no irritations productive of vomiting are reflected on to the stomach from the brain, intestines, or pelvic viscera, and when, according to Dr. Marshall Hall, the sole excitors of vomiting proceeding from the stomach itself—viz., the vagi, have been completely severed, vehement excitations nevertheless proceed from the stomach, and induce vomiting so long as the stomach has anything to eject. It is clear that the chief, if not only path of these excitations is along the splanchnic nerves to the spinal cord.

"On the other hand, Dr. Marshall Hall's statement that the motor nerves which combine to produce the act of vomiting are chiefly spinal nerves, is not generally accepted by physiologists. Dr. Brinton regards 'the medulla oblongata as that segment of the cerebro-spinal centre in which the reflection towards the periphery occurs.' I am disposed to believe that no impulses productive of vomiting reach the stomach along the path of the pneumogastric nerves, and that the only motor nerves concerned in the act, and proceeding from the medulla oblongata, are those effecting the closure of the glottis. As already stated, vomiting takes place more freely when the connexion between that centre and the stomach by means of the pneumogastric nerves is destroyed, and it is generally admitted that when the glottis is closed vomiting may be induced by contraction of the diaphragm and of the thoracic and abdominal muscles. Now, inasmuch as all these muscles are innervated from the spinal cord, it seems clear that the act of vomiting is produced by impulses emanating chiefly, at all events, from the spinal cord. If so, the chief ques-

tion remaining for determination is—whether the afferent and efferent nerves concerned in vomiting, and which are obviously spinal, are mainly related to spinal centres which at once receive the impressions and originate the motions productive of vomiting? It may be, of course, that through the agency of the cord those impressions are conveyed to the medulla oblongata, and that the motor mandates are conveyed back along the same track; but the facts which I have ascertained strongly countenance, if they do not fully justify, the belief that this question must be answered in the affirmative; and whatever may be the exact truth of the matter, they prove conclusively that, for all practical or therapeutical purposes, the doctrine that the proximate cause of vomiting has its seat in the spinal cord may be safely assumed as true.

"In cases of vomiting where there is no organic disease, as in sea-sickness, for example, if the reflecting centre whence motor impulses proceeding to the stomach and causing vomiting be the medulla oblongata, then it is obvious that our best chances of allaying the vomiting consist in lessening the reflex activity of the medulla oblongata by applying cold at once to the uppermost part of the spine, and across the base of the head from ear to ear; as a matter of fact, however, ice thus applied is generally inefficacious, not seldom worse than useless, and sometimes actually increases instead of stopping the vomiting. But if in these cases ice be applied along the whole spine, and especially along the lower half of it, the vomiting will be arrested.

"These results certainly seem to warrant the conclusion that the nervous centres which operate as the *proximate* cause of vomiting are not encephalic, but spinal. It may be said that ice applied along the spine arrests vomiting not by virtue of its sedative influence on any spinal centres which act as the proximate cause of vomiting, but by benumbing those conducting fibres of the cord which are intermediate between the spinal nerves concerned in vomiting and the medulla oblongata, and thus by lessening the frequency and force of the impressions made upon it and the impulses transmitted from it, disqualifies it for that energetic action on which vomiting depends. But if this were so, ice to the nape of the neck and across the occiput should prove far more efficacious than if applied elsewhere, because while exerting its maximum of depressing force on the conducting fibres in question, it is at the same time sufficiently near the medulla oblongata to depress it to some extent also. If, on the contrary, the function of the medulla oblongata in respect to vomiting be an inhibitory and controlling one through the medium of the vagi, while the immediate nervous agents of the process exist in the spinal cord, it is easy to understand how it comes to pass that ice along the cord will restrain vomiting, and that if applied to the

nape of the neck and across the occiput, it not only fails to do so, but sometimes increases it."

The mode of origin of the pain of visceral neuralgia generally I have endeavoured to explain in Chapter IV., and in reference to the genesis of gastric and enteric neuralgia, I have nothing further to add.

The excessive secretion of gastric mucus in some cases of gastric neuralgia manifested by the ejection of large quantities of mucus from the stomach, and the excessive secretion of intestinal mucus, more or less watery, denoted by the diarrhœa which sometimes accompanies enteric neuralgia, have also been already fully explained, and those of my readers who understand and recognize the truthfulness of that explanation will have no difficulty in explaining for themselves the origin of those morbid actions of the glands of the stomach denoted by the acrid or fetid eructations especially associated with *heartburn;* I shall therefore proceed without further discussion of these phenomena to consider a form of gastro-enteric, but chiefly enteric, neuralgia, which, owing to the peculiar and distinctive character of its cause, as well as of some of its symptoms, deserves to be specially adverted to—viz.,—

Lead Colic (Colica saturnina, Colica pictonum). As the leading features of this malady have been accurately and concisely sketched by Romberg, I avail myself of his excellent description of it:—

"The actual disease is preceded by constipation, after previous relaxation, by a sense of oppression at the epigastrium, eructations, and nausea; these precursory symptoms may continue for days and weeks. Pinching, twisting, and oppressive pains then supervene; they generally occupy the umbilical region, but also frequently the epigastrium and the hypogastrium; for the most part permanent, and but rarely shifting their position, they take place in paroxysms differing in duration from a few minutes to several hours; they often rise to the highest pitch, especially at night, and then cease, or only remit, so as to leave annoying sensations in the intervals. In most cases the pain is relieved by external pressure applied to the abdominal parietes; this is generally indicated by the position of the patient, who may be found lying on his belly, or bending forward and pressing his hands firmly against his abdomen. The derangement of sensibility is commonly accompanied by disturbance of the motor system; the abdominal walls are generally tense and hard, either throughout or only partially, and this may be a permanent condition, or, though less frequently, occurring or disappearing with the paroxysm of pain. The abdominal parietes are, in rare cases, drawn in, and when this is the case, it is chiefly at the umbilicus. If

the pain is less intense the walls of the abdomen remain soft; I have seen this to be the case even when the pain is very severe, but they never present tympanitic distension. Tanquerel has been the first to demonstrate contractions in the intestinal canal. Many patients complain of a constriction of the anus, when the pain is at the climax, and this, as well as the difficulty which then offers to the exhibition of enemata, sufficiently indicate the existence of spasm. During the paroxysm it is difficult to introduce the finger into the rectum; and when it is done it is securely grasped by the violent contraction of the sphincter. Above the sphincter the parietes of the rectum are found to approach one another, and to be almost in contact; every fit of pain causes them to contract to such an extent that the exploring finger almost appears incarcerated at the anum. As the pain remits the contraction also yields. A similar effect may occasionally be observed to occur in the contractile tissues of the urinary and sexual organs, when the pain attacks these regions; the symptoms which then present themselves are—urgent desire to micturate, an impossibiltty to introduce the catheter into the bladder, sudden arrest of the flow of urine, and a drawing up of one or both testicles.

"The symptoms to be mentioned next in order to the pain is constipation. The intestine is very indolent, and reacts but slowly, even to drastic purges. The evacuations are scanty and laboured, and consist, at first, of dry globular excrements, like sheep's dung. The sufferers are not unfrequently tormented by repeated empty straining. It is exceptional to meet with diarrhœa in connection with lead colic; but Tanquerel states that during an epidemic of diarrhœa, several patients labouring under colica pictonum were attacked, and recovered under the use of the ordinary purgative treatment of this disease. There is generally a troublesome sense of nausea, with which, especially if there be tenderness of the epigastrium, vomiting of biliary fœtid matters is often associated; no chemical examination has, as yet, determined whether these matters contain any lead.* The tongue very rarely continues clean—it is gradually thickly coated, and often has a yellow tinge. There is no appetite, and intestinal gases are more frequently discharged upwards than downwards. The urine is light, of a pale yellow colour, the skin dry, and of a normal temperature. The most frequent changes are perceived in the pulse; it is generally retarded, firm, and hard, and these characters are the more marked the more violent the paroxysm; they

* Dr. Copland, in his article on "Colic from the Poison of Lead," says,—"M. Merat analysed the matters evacuated, but could not detect any lead in them."

disappear with its subsidence. Lentin, who may be quoted as a most careful observer, became acquainted with the disease in the mines of the Harz Mountains, and remarks distinctly, that when the pains of colica pictonum are at their height, which they generally are during the first four days, he invariably found the pulse very slow, but full; in proportion as the number of beats in the minute was augmented the hope of evacuation and relief increased. Stoll states that when we meet with a pulse of such hardness as to resemble an iron wire, it is pathognomonic of the affection, and the most enduring of all symptoms, though it is not rarely often altogether absent.

"There are several characters of lead-poisoning, which prevail more or less uniformly; these are a sallow, earthy complexion, resulting from the anæmic condition of the patient, emaciation, a bluish-slatey colour of the gums surrounding the teeth, which themselves assume a brown tinge.

"A peculiar interest attaches to the complications and metastases of saturnine neuralgia. Thus, it frequently alternates with pain in the extremities, or is associated with them. Paralysis not unfrequently supervenes, and it generally affects the extensor muscles of the upper extremities, and particularly of the hands and fingers. Neuralgic symptoms, for the most part, precede; the two rarely co-exist and run their course together, and least of all do we meet with a sudden occurrence of the paralysis in the middle of an attack of colic causing the latter to cease. Many patients remain exempt from the colic when they have become paralytic. In others, the imperfectly cured paralysis is aggravated by every fresh attack of colic. We possess no proofs of the occurrence of paralysis in distinct sections of the intestine following lead colic; it is not probable, as we do not meet with tympanitic distension during life, and as there is no excessive dilatation of individual parts with a relaxed and softened state of the contractile parietes of the intestine. Besides paralysis, we also find eclampsia saturnina occurring as a complication of neuralgic lead affections; it rarely accompanies or alternates with it, but generally after the colic has run its entire course, the cerebral affection makes its appearance.

"Colica pictonum is characterised by great variability in its phenomena, which often occur very abruptly, and by fits and starts. It is exceptional to see a uniform increase and decline of the malady. When the pain is at its height, the pain often suddenly ceases, and occurs as unexpectedly. Even the final close of the disease not unfrequently takes place in this manner; it appears all at once to be cut off, and the patient is scarcely to be recognised. Nor is this variable character one of time only, but shows itself occasionally also with regard to the seat, the

pain presenting itself alternately in the hypogastric, mesenteric, or renal plexuses.

"The *duration* of the disease is influenced greatly by external circumstances, and does not, to a great extent, depend upon the intrinsic character of the disease. If the patient withdraws from his injurious occupation, and employs suitable remedies, it does not last long, and may endure from a few days to some weeks. Under less favourable circumstances it extends over several months, is less intense, and presents temporary exacerbations."

The proximate cause of the disease depicted in the foregoing passages is, I venture to assert, of the same nature as that of the ordinary neuralgiæ, although the ultimate cause is of a very different character from that in which they commonly originate. The chief symptoms of lead colic, in addition to the "pinching, twisting, and oppressive pain," may be summed up as flatulence and eructation; nausea, and sometimes vomiting; contractions of abdominal muscles, which therefore become hard and tense; hour-glass-like constrictions of the intestines, constipation, and sheep-like fæces; "empty straining;" firm contraction of the rectum, and spasmodic closure of the anus; similar constrictions of the contractile tissue of the urinary and sexual organs; hard wiry pulse; anæmia; paralysis; and eclampsia saturnina. Now, as phenomena of neuralgia of some kind or other, nearly every one of these symptoms has been already discussed, and has been shown to originate in hyperæmia of the nervous centres innervating the abdominal viscera or abdominal walls. Certain symptoms, however, not already adverted to, need consideration here, and I may premise what seems to me an interesting and instructive observation—viz., that various as these symptoms are in name, and apparently in nature, they are all referrible to one common cause, and are reducible, therefore, to one common denomination, viz.,—phenomena of preternatural muscular action. Moreover, if we carry the analysis of them a step further, we discover that they originate in precisely the same hyperæmic condition of the nerve-centres concerned in their production as that constituting the proximate cause of the symptoms previously explained. The truth of this remark is so obvious in respect to those constrictions of the contractile tissue of the urinary and sexual organs which occur in cases of lead-poisoning that I need only make this passing allusion to it. The "empty straining" is an expression of the preternatural nervous energy with which the muscles concerned in the act of defæcation are stimulated, and is partly a reflex action originating in the irritating impressions produced by the hardened fæces imprisoned in the intestines by the hour-glass contractions of its walls. The "hard wiry pulse" denotes that the circular muscles constituting the "muscular coat" of the arteries are so

vigorously or spasmodically contracted, owing to their excessive stimulus by the vaso-motor nerves, that, losing their normal softness and compressibility, they have assumed a condition of prolonged cramp, one of the characteristics of which is hardness; and it is obvious that when arteries of small diameter, such as that of the radial, for example, are affected with this cramp the impression produced by touching them can scarcely fail to be not only that of hardness, but of wiriness also. The anæmic condition which is characteristic of sufferers from lead-poisoning is a direct result of that general contraction of the peripheral arteries produced by the excessive irritation, and therefore preternatural energy of vaso-motor nerve-centres generally. And as the hyperæmia due to that irritation exists not only in those centres, but throughout the spinal cord, precisely that condition constituting a predisposition to epileptic convulsions presents itself, and that condition having been established, it is only needful that that contraction of the peripheral arteries just mentioned should, in so far at least as the brain-arteries are concerned, be a little more intensified, so as to induce that degree of cerebral anæmia constituting the first stage of an epileptic paroxysm, in order that an attack of eclampsia saturnina may occur. Of the principal morbid phenomena produced by lead-poisoning there now only remains for consideration that of paralysis, which not unfrequently occurs, and which almost always affects the extensor muscles of the forearms. The occurrence of paralysis in such cases seems at first sight inconsistent with the hypothesis here advanced, that the proximate cause of all the phenomena in question consists in excessive irritation and consequent preternaturally vigorous action of both the spinal and ganglionic nervous centres, but due consideration of the subject will, I believe, induce a conviction that the paralysis in question is exactly the malady which *à priori* reasoning might lead us to expect that the proximate cause just mentioned would produce. In a preceding chapter* I have shown that paralysis of sensory nerves (anæsthesia), paralysis of the optic nerve (amaurosis), and paralysis of the extensor muscles of the leg have been produced by morbidly intense action of vaso-motor nerves causing spasm of blood-vessels, and consequent local anæmia, and I apprehend that the paralysis resulting from lead-poisoning is caused in the same way. This, however, is not the place for a full exposition and justification of my pathological views concerning this form of paralysis, and I therefore advert to the subject here only so far as is necessary to show that the occasional presence of paralysis in cases of lead colic in no degree invalidates my general

* *Vide* Chapter III., p. 21 *et seq.*

proposition, that this special form of gastro-enteric neuralgia, as well as its usual concomitants, is an immediate consequence of spinal and ganglionic hyperæmia, which is itself produced by the irritating influence of the lead pervading the system. If, as I have now indicated, this metal does, *inter alia*, actually stimulate the vaso-motor nerve centres, and therefore by their agency cause vigorous contraction of peripheral arteries, it must necessarily operate powerfully in both preventing and arresting hæmorrhage. The fact that it does so—a fact empirically discovered and thoroughly established by long experience—receives a complete explanation by the foregoing exposition, and affords at the same time confirmatory evidence of its truth.

Hepatic Neuralgia (Hepatalgia, Pain of the Liver) rarely presents itself, except in those slight fugitive forms which occasion no grave anxiety either to physician or patient, and which, according to my experience, generally yield to treatment continued during a few days with free doses of chloride of ammonium. Very severe cases do, however, occur from time to time, most generally in women, and especially in those who are liable to neuralgia in other situations, or who suffer from uterine disorder: in a severe case under the care of Dr. Stokes dysmenorrhœa had long existed. The pain is commonly more or less continuous, but is characterised by exacerbations, sometimes notably violent, and often apparently induced by mental emotion, great excitement of any kind, fatigue, disorder of the bowels, and the recurrence or irregularity of the catamenia. The pain, when at its worst, appears to be more severe than that of acute hepatitis, and is generally accompanied with tenderness of the hypochondrium and epigastrium. According to Dr. Stokes, there is sometimes also slight jaundice, "but generally," as remarked by Dr. Copland, "there is no sign of structural lesion of the organ, except pain. Neither fever, nor swelling, nor thirst, nor biliary obstruction is present: the tongue is not loaded; the urine is not dark, turbid, or scanty; the stools are natural, or not materially disordered; and the functions of the stomach not greatly affected." Dr. Copland, who, he says, has seen the disease "connected with excessive menstruation, and with other disorders of the uterine functions," remarks—"the nature of the pains, their severity, the suddenness of their succession and disappearance, their intermissions, the good state of health in the intervals—all lead to the belief that they are the result of morbid sensibility manifested in the nervous filaments or plexuses of the liver—of the nerves supplied by the great sympathetic or pneumogastric. Whether or no there may be, in some cases, latent causes of irritation of these nerves, as biliary concretions lodged in the ducts, or in the gall-bladder, although not productive either of biliary

obstruction or of vascular disturbance, has not been fully ascertained. M. Andral states that he has not found them in cases which he has inspected; but in one case where hepatalgia had been complained of for many years, the gall-bladder contained a number of concretions; and in another, the patient had once experienced an attack which had been recognized as having arisen from the passage of gall-stones into the duodenum."

Those cases of so-called hepatalgia in which the pain is presumed to have been produced by the presence or passage of gall-stones are, of course, very simple: the gall-stones, acting as foreign bodies, cause morbid excitement of the hepatic sensory nerve-centres with reflex actions on the muscular coat of the bile-ducts, and consequent spasmodic contraction of that coat producing pain in the manner already explained in Chapter IV. But according to the conventional phraseology, cases of this kind are not truly neuralgic: in the words of Dr. Copland, hepatalgia "consists of very severe pain in the region of the liver, which is not accounted for by any organic lesion of this viscus or of its excretory ducts that can be discovered during life or after death." Now, pain in the region of the liver existing apparently without any organic, and often, indeed, without any assignable cause, must, nevertheless, be due to a cause as real, and in fact, as substantial, as any of those which, being easily apprehensible, are called organic. The question therefore arises—What is the probable nature of the cause or causes operative in such cases? That condition of excessive excitement of those particular nerve-centres which, when violently excited, produce a consciousness of pain in the liver, must be induced in one of three ways: (1), it may be induced by modifications of state in the liver itself—modifications affecting the sensory nerves distributed throughout that organ, and thus exciting the nerve-centres into which those nerves converge; (2), it may be induced by irritation of sensory nerves more or less remote from the liver, such irritation of the centric nerve-cells primarily affected being secondarily extended to those nerve-cells related to the sensory nerves of the liver; or (3), it may be induced by aboriginally preternatural activity of those cells, such undue activity or "morbid sensibility" being inherited by the sufferer from one of his or her parents or grandparents.

Considering how various in quality are the solids and fluids introduced into the stomach of almost every member of the "civilized" world, and how greatly they differ in different persons, the wonder is, not that the orderly functions of the liver are so little disturbed as they seem to be, but that the multifarious influences continuously teeming into it through the portal vein, which drains the extensive area of the stomach and intes-

tines, do not derange the delicate operations of the organ, and cause tumultuous excitement of its nervous mechanism far more frequently than they appear to do. But though the constitutional robustness of the majority of persons enables their several organs to withstand the disease-exciting influences of the various noxious agencies to which they are exposed, there is always a large number of individuals so delicately framed that each part of their organism is quickly thrown into disorder by contact with such influences. When ordinary atmospheric air is suffused with certain other elements in proportions so slight as to produce no conscious effects on the majority of persons, who, indeed, may not even perceive their presence, other persons, preternaturally sensitive, breathing the same air become more or less seriously ill by doing so. I have seen many cases of this kind ; the following are examples : A lady driving in a carriage at Brighton (for the benefit of the air, forsooth !) passed through a part of the town in which is a tallow-chandlery just at the time when the fat was being "rendered;" and though she did not go near (probably not within a-third of a mile of) the building, the effluvium from it suffusing the air she breathed brought on an immediate and violent attack of vomiting, purging, rigidity of the limbs, and almost death-like coldness of the surface of the body. One of my patients generally experiences a distressing sense of suffocation if she goes through a long railway tunnel, or travels by the Underground Metropolitan Railway, and on more than one occasion the pulmonary congestion caused by travelling by that railway has been such as to result in pulmonary hæmorrhage before she could regain the open air. The effect of the odour exhaled from hay on some persons, in whom it excites "hay-asthma," is well known ; and equally well known is the fact that the fumes of tobacco mixing with atmospheric air in proportions so small as to be scarcely perceptible by ordinary people are intolerable by some persons, and often excite in them persistent coughing. I am acquainted from personal observation with a case in which the odour of a bunch of freshly-gathered roses has on several occasions exercised such an influence on the cerebral circulation as to produce faintness and complete unconsciousness. Indeed, while the marvellous effects of violent emotions on the intellectual functions are facts of common experience, hundreds of cases are on record in which mental emotions alone have produced an immediate change in the quantity and quality of some one or more of the animal secretions. Facts of the kind here adduced being admitted, we have no difficulty in understanding that real and great physical changes, though of a kind too subtle to be detected by the scalpel or microscope, may be wrought in the liver by influences of various kinds—influences converging

from the stomach and intestines and conveyed to every part of it in the portal blood, and influences still less apprehensible and demonstrable but probably even more potent, viz., those which originate in tumultuous mental emotions, or in states of habitual mental depression, and which are directly diffused through the liver by the agency of the nerves branching to every cluster of its secreting cells from the solar plexus. These considerations seem to me to lead inevitably to the conclusion that in a certain proportion of cases influences of the kind indicated must produce morbid excitement of the hepatic sensory nerves to such an extent as to cause consciousness of pain. If the sensory nerve-cells directly related to the hepatic sensory nerves be alone affected by the irritation, the pain which is referred to, or experienced in, the liver constitutes what is usually understood as hepatic neuralgia. But if the centric irritation extend from the sensory cells primarily affected to neighbouring cells also sensory, the pain really originating in the liver may be referred to another part of the body; and we know as a matter of fact that pain felt under the shoulder-blade is so often associated with disease of the liver that it has come, and rightly so, to be regarded as symptomatic of disorder of that organ.

Those cases in which hepatic neuralgia is induced, as I have said, "by irritation of sensory nerves more or less remote from the liver," are simply forms of reflex action in which the angles of reflexion are too obtuse to permit of the pain being referred to the organ in which the irritation originated, such forms being due to the extension of the centric excitement from the cells primarily implicated to adjoining cells into which hepatic sensory nerves converge. Bearing in mind how peculiarly liable are the stomach and bowels to become disordered, and their close physiological as well as physical proximity to the liver, we readily understand how easily disorders originating in them may express themselves by reflex agency in the shape of hepatic pain, and how likely they are to do so. Superadded to these sources of hepatic neuralgia common to both sexes, women have special sources of the malady in the uterus and mammæ, the blood-currents of which are almost constantly in a state of ebb or flow, and which are always peculiarly liable to disturbance. Irritating impressions from these organs, when in a state of excitement or irritation, can scarcely fail to be reflected more or less on to the liver, and in some cases to such an extent as to cause a consciousness of pain in it; and inasmuch as uterine excitement notoriously diffuses its disturbing influence over all the viscera, women must inevitably, we apprehend, be much more liable than men are to visceral neuralgia, and therefore to neuralgia of the liver. That constitutional predisposition to hepatic neuralgia may exist as a consequence of so-called idio-

pathic preternatural activity of the sensory nerve-cells directly related to the afferent nerves of the liver there can be no doubt. This preternatural activity may be aboriginal, *i.e.*, inherited from the progenitors of the sufferer, or may be induced by some one or more of the many causes which contribute to irritate, and thus render hyperæmic, the nerve-centres in question, and which, acting persistently during a long period, generate a morbid habit, possibly ineffaceable even after its causes have long ceased to operate.

Renal Neuralgia (Nephralgia, Pain of the Kidney), like hepatic neuralgia, is not a very frequent affection, and, like it, presents itself much oftener in women than in men. There can be little doubt but that when the malady occurs in persons of the male sex it is, in the great majority of cases, due to the passage of a urinary calculus; but the opinion is held by competent authorities, and I am sure, justly, that men who have never been troubled with urinary calculi do occasionally suffer from renal neuralgia. The reasonableness of this opinion will be made manifest by due consideration of the proximate cause of renal pain. But when men suffer from it the character of their suffering is in several respects the same, whether its ultimate cause be a calculus or not. In those cases of renal neuralgia not assignable to a specific cause, pain, sometimes dull, but often very severe, is felt in the loins—pain much less apt to be intermittent and periodic than most neuralgias generally are. If the attack is severe, there will probably be pain or numbness, or both, along one or each thigh, and in the male there may be retraction, and even pain in one or in each testicle. There is also frequent desire to micturate, the urine being, in most cases, both abundant and pale. Women who suffer from this affection are generally also troubled with persistent leucorrhœa; and often with dysmenorrhœa; and both male and female patients are commonly notable for their nervous temperament or neuralgic diathesis. When nephralgia is caused by a urinary calculus it is usually much more intense than it is in cases of simple neuralgia, and while there may be also nausea, vomiting, and bloody urine, the urine in almost all cases is not pale, but high-coloured. Indeed, the symptoms of calculous nephralgia are very like to those of nephritis, the main difference consisting in the fact that the severe febrile symptoms are not present. Calculous nephralgia may also in some cases be distinguished from nephritis by the more sudden invasion, as well as by the sudden cessation of the malady, and, inasmuch as renal pain of non-calculous origin is generally more continuous than are neuralgias of other regions, the sudden cessation of nephralgia may be held as a general rule, liable, however, to exceptions, to differentiate it also from renal neuralgia strictly so called.

The pathology of nephralgia is exactly analogous with that of hepatalgia, and therefore needs no special exposition; and when the disorder is of calculous origin the pain incident to the passage of a urinary calculus down the ureter corresponds pathologically with that caused by the passage of a gall-stone, and is produced in precisely the same way. Moreover, the numbness or pain experienced in the thigh and the retraction of the testicle are phenomena of reflex action, the analogues of the pains in the shoulders accompanying neuralgia of the liver.

When adverting to the causes of that malady, I showed that the numerous and diverse influences conveyed from the stomach and bowels to the liver in the portal blood must inevitably in certain cases produce such an irritation of the peripheral ends of the hepatic sensory nerves as to originate hepatalgia quite independently of the irritating action of gall-stones: now, when we consider the exquisitely delicate structure of the kidneys, and that they are continuously flooded with blood suffused with the effete products of a great variety of morbid as well as of normal processes occurring throughout the body, we easily understand how constantly liable the renal sensory nerves must be to irritating influences productive of renal neuralgia. The inorganic urinary deposits commonly recognised—uric acid, the amorphous urates, urates of ammonia and soda, oxalate of lime, ammoniacal and earthy phosphates, carbonate of lime, cystine, leucine, and tyrosine—constitute alone an array of agents which, before they have reached the stage of concretion, may produce distressing excitement of the renal nerves. As stated by Dr. Roberts,* "close examination of sections of the kidney sometimes reveals the existence of numerous yellowish or brownish striæ, running from the papillæ towards the base of the pyramids. These are due to the precipitation of amorphous urates within the straight canals. This is generally only a post-mortem phenomenon . . . a similar precipitation may, however, occur during life, and constitute the first link in a chain of consequences which lead eventually to the production of urinary gravel and stone. Uric acid and oxalate of lime may also be deposited in the same manner, and furnish the nuclei of future calculi." The common cysts not infrequently found in the kidneys may, by the pressure exerted on the surrounding tissue during their development, cause pains like to those of ordinary renal neuralgia: in a case quoted from Rayer, by Dr. Roberts,† "there were recurrent attacks of excessively violent lumbar pains, severe gastric symptoms, abundant

* "A Practical Treatise on Urinary and Renal Diseases, including Urinary Deposits." London: 1865, p. 402.

† *Ibid.*, p. 430.

discharge of watery urine." In cases of cancer of the kidney not only is there an appreciable tumour and hæmaturia, but pain in the loin, which is commonly intermittent, and which "shoots down in the course of the ureter to the inside of the thighs." Nausea, vomiting, and anorexia are also common.* A dull pain in one or both lumbar regions, accompanied with frequent micturition, the urine being turbid, and sometimes mixed with blood, is also produced by the presence of tubercle in the kidney. Moreover, hydatid and other entozoa which occasionally infest the urinary organs originate, among the least of the evils which they work, violent pains in the lumbar region, with all the symptoms of violent nephralgia. Of course, renal pain may result from irritation of parts remote from the kidneys by the familiar process of reflex action; and I apprehend that the reason why women suffer much oftener than men from renal neuralgia consists in the fact that, because, from the dawn of puberty to the close of the reproductive period the ovaries and uterus are going through perpetual changes incident either to the process of gestation or to that of menstruation, the sympathetic ganglia presiding over the pelvic viscera, together with the spinal cord in women, are kept in an almost, continuous state of excitement, and consequently exalted vitality, by the ever-recurring impressions which they receive from the womb. Such being the fact, it is impossible to imagine otherwise than that the sensory cells of the nervous centres just named must be far more active and sensitive in women than they are in men, and therefore peculiarly predisposed to assume conditions of morbid excitability resulting in neuralgia most likely to occur by reflex action in organs near the womb as well as in the womb and ovaries themselves. The so-called hysterical—*i. e.*, hyper-sensitive women are precisely those who suffer most and most frequently from renal neuralgia. Of course, constitutional hyperæsthesia is often transmitted from parent to child, and therefore, before the reproductive organs exert in the nervous centres in question the peculiar influence just mentioned, many women are already specially predisposed organically to neuralgias of the abdominal and pelvic viscera, while all women are necessarily far more liable to them than men are. And, I may add, that inasmuch as the whole nervous mechanism of women is pre-eminently sensitive and mobile, strong mental emotions occurring in them disturb the orderly functions of the kidneys to a much greater extent than is the case in men. Cerebral tumults are propagated down the female spinal cord with astonishing rapidity, and thence along the positive motor nerves, connecting it with the kidneys, which, instantly partaking of the excitement,

* *Ibid.*, p. 445.

begin to function far more vigorously than before, the result being the secretion of a preternaturally large quantity of pale urine. Of course, the same result may be, and very often is, induced through reflex agency by irritation of the ovarian or uterine nerves; but whatever may be the source and path of the primary excitement propagated to the motor nerves effecting the renal secretion,* they, when excessively excited, stimulate with preternatural energy the secreting cells of the kidneys, and thus cause them to draw into and pass through the renal capillaries in a given time an excessive amount of blood: effete products of organic decomposition constantly going on in every part of the body, which it is the function of the kidneys to eliminate, are, along with a portion of water, withdrawn from the blood while it thus passes through; and, of course, the secreting cells of healthy kidneys only withdraw from the blood those elements constituting the urine in the proportions in which they present themselves in the blood. Now, unless under very exceptional conditions of the human organism, the watery element of the blood is always abundant; therefore, when an abnormally large amount of blood is passed through the kidneys within a given space of time, an abnormally large amount of water is transuded into the Malpighian capsules, and is thus abstracted. In this way I explain the curious but extremely common phenomenon of nervous excitement—the discharge of an extraordinarily abundant amount of urine. The paleness and low specific gravity of the urine in such cases are phenomena not less remarkable than that of its superabundance, and equally call for a few words of explanation. As I have just said, "the secreting cells of healthy kidneys only withdraw from the blood those elements constituting the urine in the proportion in which they present themselves in the blood"; and as the patients by whom a great quantity of pale urine is discharged are generally delicate and nervously-excitable women, who are unhabituated to vigorous mental or bodily exertion, it is obvious that the metamorphosis of their cerebral and muscular tissue must be *comparatively* slight. Hence the amount existing in the blood of those effete compounds resulting from the transformation and decomposition of brain and muscle must also be correspondingly small. The consequence is that when in the cases in question the kidneys are excessively excited the urine they elaborate from the blood contains those compounds in minimum quantities; and as both the

* This is not the place in which to discuss the existence and functions of the renal nerves, but I may say here that facts which have been ascertained render it highly probable that the innervation of the kidneys is identical with that of the salivary glands.

colour and specific gravity of the urine are, as a general rule, proportionate to the amount of those compounds dissolved in it, it follows that when patients of the kind mentioned void urine superabundantly it is necessarily pale. Dr. Handfield Jones is of opinion that "the common result of an hysteric attack shows clearly that the capillary membranes of the Malpighian tufts must be remarkably altered for the time, so as to allow of a greatly increased transudation of aqueous liquid, while at the same time the secreting action of the epithelium of the cortical tubes is much diminished."* Dr. Jones offers no explanation of the mode in which these alterations are effected, whereas the hypothesis just given of the phenomena in question, while in strict accordance with the facts of the case, thoroughly explains them in the simplest possible way.

The other morbid phenomena which I have mentioned as being frequently associated with renal neuralgia—viz., leucorrhœa and dysmenorrhœa, I shall advert to more particularly in a subsequent section—viz., that on uterine neuralgia.

Neuralgia of the Bladder is a comparatively rare disorder, and when it exists is commonly associated, as enteric neuralgias are, with spasm, which, though traceable in the majority of cases to a specific cause, seems not infrequently to be what is called neuralgic. Involuntary and uncontrollable contractions of the bladder, whether due to a discoverable cause or not, are often exceedingly painful. Moreover, irrespective of such morbid contraction, severe pain in the bladder, most especially at its neck, is occasionally experienced: as remarked by Sir Henry Thompson, —"Usually the patient complains of symptoms greatly resembling those of stone, but repeated soundings fail to detect a stone, or any other deviation from the normal state of the organs. The urine is healthy, or at most, only occasionally contains traces of undue action of the mucous membrane. Errors in diet sometimes aggravate the symptoms—sometimes have no effect. Change of air and scene often produce an improvement, which, unhappily, is only temporary. By careful investigation a deranged state of the liver, early stages of renal disease, the presence of hæmorrhoids, commencing cerebral changes late in life, or miasmata, may be found to account for some cases; but nevertheless a few remain apparently inexplicable. Such are usually regarded, for want of a better, or more certain knowledge, as examples of 'neuralgia' of the neck of the bladder."† These "inexplicable" cases are generally examples, I apprehend, of

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* "Clinical Observations on Functional Nervous Disorders," p. 442.

† "System of Surgery," by various authors. Edited by T. Holmes. Vol. iv., p. 358.

reflex action originating in some other part, usually a neighbouring part, of the organism. I have frequently been consulted by women concerning pains in the bladder, which, I have convinced myself, were reflex results of ovarian or uterine irritation. In some cases the vesical neuralgia may be propagated by extension of morbid excitement of sensory nerve-cells already implicated to those related to the sensory nerves of the bladder.

Neuralgia of the Urethra is very seldom met with. Romberg mentions "a neuralgia affecting the entire passage, or only a portion of the urethra, which has hitherto been observed exclusively in the male sex; its symptoms are agonizing pain or itching in the part affected. Erection and coition increase the pain, which has been preceded by gonorrhœa of shorter or longer duration." Assuming the truth of the doctrine advocated throughout these pages—viz., that the seat of the proximate cause of all neuralgias is not in the nerves affected, but in the nervous centres to which those nerves are centrically related, it is obvious that neuralgia primarily manifesting itself in any one of the pelvic organs may easily be extended to the others: the following remarkable case, recorded by Dr. Macculloch, is an instructive example of such extension. The patient when first attacked suffered during some weeks from "an occasional sensation like a spasm, apparently situated in the urethra, about the prostate gland, recurring three or four times a day, and causing little uneasiness. Gradually these sensations increased in frequency, and were attended with a general sense of irritation about the neck of the bladder, very much increased by walking, and at length producing spasms in various parts, with a tendency to an hysterical paroxysm. No apparent fever of any kind was at first present; nor any suspicion of its real nature entertained; while the disorder, not yet strictly periodical, was referred to the urethra and bladder. Very shortly there supervened a debility, with occasional numbness in one leg; and it was easy to trace by the tingling sensation formerly described the course of the fibular nerve. At the same time also it was perceived that the mere act of bending the neck forwards brought on the sensation in the perineum, and further, caused the patient to totter on the affected leg." The pain increased in severity, and became "as regular as the attacks of neuralgia are when most perfect. . . . In this aggravated state also it became plain that the primary seat of the pain was in the rectum, the patient describing it as a burning heat, as from a heated solid introduced, which was shortly communicated to the bladder, producing irritation and strangury. When of this severe nature, that irritation extended even round the thighs and over the lumbar region; so that the slightest touch produced great uneasiness. . . . Further, during the severity of the

attack all the limbs were affected with spasms; and very generally there supervened a fit of hysteria, with a great degree of general derangement throughout the whole system, consisting of the usual symptoms of a severe remittent in all their worst forms. Lastly, as the irritation of the bladder appeared to spread along the ureters to the kidneys, there came on diabetes, the diabetes mellitus; while, when this symptom was peculiarly severe it was attended with an acute pain in the left, but not in the right kidney. . . . And respecting this part of the disease, I must further add, that it was rigidly paroxysmal, or that the morbid secretion of sugar commenced with the general fit, and entirely disappeared in the interval."* Some time ago I was consulted by a gentleman who, two years and-a-half previously, had squeezed his right testicle, producing acute pain, which lasted about a month. It then, as he said, left the testicle, and went to the perineum, where, with slight intervals of ease, it had persisted until I saw him. But during the twelve months before that time "the same pain" had invaded the penis, and became more intense after sexual connexion. It will be observed that in both these instructive cases the permanent seat of the pain was different from that in which it originated, and that in both there was not only a change of place, but also an extension of area occupied by the malady. These interesting phenomena I regard as merely peripheric expressions of centric modifications to which they accurately corresponded in the manner already fully described.

Neuralgia and Hyperæsthesia of the Testicle.—Neuralgia of this organ varies greatly in character and severity; it is sometimes dull and continuous, sometimes intensely acute, lancinating, and paroxysmal; and occasionally, as remarked by Dr. Humphrey, it is "so severe as to cause the patient to roll on the floor in agony, covered with perspiration." Sir Astley Cooper, who gave especial attention to this malady, has described its symptoms in the following lucid paragraph:— "In the irritable or neuralgic testis, the patient has an unnatural sensibility in a part of the testicle, or epididymis; it is extremely tender to the touch, painful on exercise, and unusually sensitive at all times. Its sensibility becomes

* "An Essay on the Remittent and Intermittent Diseases, including generally Marsh Fever and Neuralgia." By J. Macculloch, M.D., F.R.S. London. 1828. Vol. ii., pp. 93-4 5. The fact mentioned by Dr. Macculloch—viz., that along with the presence of sugar in the urine there was probably some disorder of the upper part of the spinal cord—disorder made manifest by the movement of bending the neck forwards, which "brought on the sensation in the perinæum"—becomes additionally interesting when considered in the light of the modern doctrine, that diabetes originates in the nervous system.

occasionally so much increased that the slightest touch produces exquisite suffering, and the pain is felt in the back and groin. The motion of the testis, and the slight pressure it receives in walking, produce so great a degree of pain as almost to forbid exercise, and the patient is obliged to seek relief by continually reposing on a sofa, or remaining in bed. The testicle is but little swollen; it is not equally tender in every part, but there is a point in which the morbid sensibility peculiarly resides. The epididymis and spermatic cord also suffer from similar sensibility; and if the part be not supported the pain is scarcely tolerable; and when the patient is in the recumbent position he is obliged to place himself on the opposite side to the disease, or he does not rest. He has pain in the groin and thigh upon the same side, and the testicle appears fuller, and more loaded on that side than on the other. Motion, in most cases, produces not only pain at the time, but much increased inconvenience for some hours after; the pressure of the hand, in examining it, occasions great uneasiness, and leaves the testis additionally sensitive. The stomach is rendered extremely irritable, even to the degree of occasional vomiting. The disease frequently continues for many weeks, sometimes for months; in others it endures for years; and if at any time the patient believes that the sensibility is somewhat diminished, and that he may venture upon slight indulgence, the want of precaution in position or exercise renews all his former sufferings."

Besides the very severe forms of the malady described in the foregoing paragraph, neuralgia of the testicle, occasioning much less suffering and inconvenience, is more frequently met with; and many cases occur in which irritation and tenderness, or morbid excitability rather than pain is the chief feature. Of course, however, in such cases a slight touch, or the chafing of the dress, produces pain immediately, and sometimes an emission of semen. While writing these lines I have under my care two cases of this kind: in one of them involuntary seminal emissions, without any apparently immediately exciting cause, occur, and prolonged aching of the testicles, with a painful sense of weight, necessitating the use of a suspensory bandage, is experienced; in the other case preternatural sensibility, but without pain, and accompanied with frequent emissions, constitutes the trouble. In the latter case, if the testicles are chafed by the trousers, or, indeed, are rubbed in any way, an emission of semen is induced. Both patients are young men, and in both the disorder originated in masturbation. But, independently of this pernicious habit, the testicles are liable, about the period of puberty, to become tender and irritable.

That in the various cases of neuralgia, or mere hyperæsthesia of the testicle, the real seat of the disease is not in that organ,

but in the nervous centres innervating it, is proved by cases on record in which castration has been performed without abolishing the pain; and certain other facts point to the same conclusion: in a case under my care the disorder resulted from slight injury of the spine; in severe cases the pain in the testicle, however originated, is accompanied by pain in the back, groin, and thigh; the neuralgia may be induced (as it is when induced by masturbation) by reflex action through the agency of the nervous centre with which the testicles are connected; and, finally, in neuralgic testicles which have been removed in order to give relief, careful dissection has generally failed to discover, as Sir A. Cooper states, "any apparent changes of structure in them." I say *generally*, because, of course, cases may and do occur in which the neuralgia may be caused by direct injury of the testicle, effected either mechanically, or by structural disease. A case, related by Dr. Ludlow, is mentioned by Dr. Humphrey, of a patient, æt. twenty, who suffered during six years from neuralgia of the testicle, "originating in an injury. Mr. Stanley excised the testicle; the tunica vaginalis was thickened and adherent, and the epididymis changed into a firm white substance;" and, as Dr. Humphrey also observes, "it now and then happens that a small collection of pus pent up in the testicle is a source of a good deal of irritation, and gives rise to frequent recurring attacks of inflammation. In the Museum of the College of Surgeons is a testicle with a small abscess in the epididymis; it was extirpated because it had for many years been the seat of the most severe pain."*

Ovarian Neuralgia.—Ovarian pain, most frequently on one side only, but sometimes on both sides simultaneously, is often met with. It is deeply seated in the iliac fossa or fossæ, and is of all degrees of severity—from a slight dull aching to an acute, throbbing, and utterly prostrating anguish, which in some rare cases is productive of syncope. Sometimes, accompanying the ovarian pain, there is pain, more or less paroxysmal, in the lumbar region, and along the thigh and leg on the side corresponding to that of the affected ovary. Of course, in those cases in which both ovaries are attacked, both thighs and legs may be sympathetically painful. Besides the pain, a sense of weight in the ovarian region may be experienced, and cases occur in which almost any sudden movement will instantly bring on the pain, or, if it is already there, will greatly increase it. Sometimes the passage of hardened fæces along the sigmoid flexure of the bowel, or the act of defæcation proves exceedingly painful. In some

* Article on Diseases of the Male Organs of Generation. By G. M. Humphrey, M.D. Contributed to the "System of Surgery." Edited by T. Holmes, M.A. Vol. iv.

cases tenesmus, in others dysuria, is experienced, and in others both are present. Nausea or vomiting is also a frequent concomitant.

The ovaries are liable to be affected by a large number of morbid influences, and they are small, deeply-seated organs; it is often, therefore, peculiarly difficult to distinguish between the different and various causes of ovarian pain. The ovaries are liable to displacement, which may result in pain; they are peculiarly liable to inflammation, which may go on to the formation of abscesses; simple and compound or proliferous cysts, as well as cysts containing fat, teeth, hair, &c., are formed in them; tubercle may be deposited in them; and they may become the seat of cancerous tumours, especially those of the colloid kind. These several disorder, while in their initial stage, may cause pain of all degrees of severity, and yet in that stage it may be impossible to determine in any given case what is the real cause of the pain in question. Indeed, the only trouble complained of, and the only pathological phenomenon observable may be pain in the region of the ovary: in such a case the pain may be designated neuralgic; and time only, by allowing its cause to become developed and clearly recognizable, may enable the diagnosis to be corrected. Nevertheless, even at the beginning of the different ovarian diseases, a careful study of the history, circumstances, and constitutional peculiarities of each case will go far in aiding the physician to effect a differential diagnosis between them and such ovarian pain, as by common consent is rightly called neuralgic.

There is pre-eminently, however, in the region of ovarian disorders a border-land where diseases, which, according to the current phraseology, are distinguished from each other as "structural" and "functional," respectively, merge into each other so gradually as to become, in fact, undistinguishable; indeed, even the normal function of the ovary partakes, in no slight degree, of the nature of inflammation, and is always beset with danger. The process of human ovulation, recurring every few weeks from the age of puberty until the period when menstruation finally ceases, and consisting in the evolution and bursting of Graafian vesicles, with discharge of ova, is strikingly analogous with the process of dentition, and is equally associated, in a large proportion of cases, with local and constitutional disturbance, involving irritation, excitement, and very often grave disorder of the nervous system. Just as during the cutting of teeth the gums swell, and the mucous membrane having been gradually thinned, owing to the pressure of the growing teeth, is finally pierced by them, so at each menstrual period the ovaries swell, the vesicles containing the ripened ova press against the peritoneal coat of the ovaries,

cause the points pressed against to become thin, and at length force themselves through it at those points, and then, bursting themselves also, discharge their contents into the Fallopian tubes. The remarkable likeness of the tumultuous phenomena association with the process of ovulation to those constituting ordinary inflammation, is impressively exhibited by Dr. Ritchie in his elaborate and thoroughly scientific treatise on "Ovarian Physiology and Pathology." He says,—"The periodical turgescence and enlargement of these bodies (the ovaries) before and during the flow of the menses, which may often be seen in women with irritable ovaries, and in cases of ovaritis, and of the different forms of encysted disease, and of suppuration of these glands; the monthly anasarca of the lower limbs, a consequence apparently of venous congestion, which is often found to accompany menstruation; and the remarkable engorgement of the ovaries, which is ascertained uniformly to precede and attend the catamenia in a case of tumour of the uterus, with healthy ovaries, which is known to the writer; together with the increase in volume—also observed to have been undergone by the sound ovary in an inguinal ovarian hernia at every flow of the menses—and the almost total disappearance of the gland on any occasion where the menses are abundant; united with the fact that, in certain cases of amenorrhœa from disease of the ovaries, the menstrual discharge is sometimes restored immediately on the increase of the capillary circulation of the enlarged ovaries, which is induced by a course of mercury, are again, each of them, circumstances which indicate that before and during menstruation the ovaries are the seat of an increased vital activity and phlogosis."* Moreover, unlike most animals whose generative organs become active only during the period of rut, human beings foster and indulge in the excitement of their sexual nature, not only without being impelled by the longing for offspring, and even when they are anxious not to have children, but also when they are comparatively—indeed, often completely—free from the determining and, more or less, irrisistible force of the blind reproductive instinct. This ample "border-land," as I have called it, notable for the mergence of "structural and functional" diseases into each other, is especially productive of "aches and pains," having no demonstrable organic cause, and abounds in those disorders of whieh hyperæmia and hyperæsthesia are the chief characteristics.

On the other hand, incomplete, abortive, or interrupted ovulation, due, it is believed, to insufficient sexual energy or sexual stimulus,

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* "Contributions to assist the Study of Ovarian Physiology and Pathology." By Charles G. Ritchie, M.D. London: 1865, p. 118.

may result in a low chronic form of ovarian inflammation, and consequent ovarian pain, also unaccompanied by any morbid organic disease appreciable during life. The fact that ovulation occurs independently of sexual union is now thoroughly established; nevertheless, there are good reasons for the opinion that, though coitus may not be the efficient cause of the rupture of the ovarian follicle, it is certainly capable of hastening that event, of ensuring its completion, and, indeed, of effecting its occurrence when, otherwise, it would not take place. Two experiments by Coste on the rabbit tend to substantiate this opinion.* "In the first of these, the animal was in heat, and manifested great ardour for the male, but coitus was not permitted. It was kept for forty-eight hours, and then killed. The genital organs were highly congested. Six follicles in one ovary, and two in the other were, apparently, ready to burst, but no rupture had yet taken place. In the second experiment, the animal remained in heat for three days; on the fourth day the heat ceased, and on the fifth it was killed. The organs were in the same condition as in the last case, but no follicles had burst. Coste attributes the absence of rupture in these cases to the prevention of the coitus at a time when, if permitted, it would, in his view, have determined that event." Experiments of this kind must, of course, be largely multiplied before great stress can be laid on their seeming significance. Moreover, as Dr. Farre justly observes, it is not yet known how far the symptoms "generally assumed to indicate ovarian inflammation, especially in a chronic form, may be merely the external evidences, not of natural, but of aberrant or disappointed ovulation. For just as an abscess is painful generally in exact proportion to the unyielding nature or tension of the parts by which it is surrounded, so it is probable that when the follicle or the entire ovary becomes tense from the effusions which have been shown to have taken place ordinarily within it, and this tension is not relieved because rupture does not occur at the proper time, so that ovulation is disappointed, or is aberrant, the symptoms which might be expected to accompany such an interrupted process would be those which are usually set down as indicating inflammation in a part. This matter appears hitherto to have been hardly thought of, and yet it is probable that to *abortive or interrupted ovulation* may be referred the commencement of many of those morbid conditions of the ovary which are not either malignant or the direct results of inflammatory action. Probably, many of the cystic diseases of the ovary originate in

* I quote the report of them from Dr. Farre's able and comprehensive article on "The Uterus and its Appendages," in the supplement to "Todd's Cyclopædia of Anatomy and Physiology," p. 568.

this way."* Such cases of "abortive or interrupted ovulation," when they do occur, must obviously be expressive of either insufficient expenditure of cerebro-spinal nervous energy on the glandular structure of the ovaries, or of the transmission of too much of the like force from the sympathetic centres along the arteries nourishing the glands. In either case, the malady originates in the nervous system, and when manifested in the ovaries, their disorder produces disorderly re-action on that system. In either case, therefore, as well as in those ovarian maladies already adverted to in which pain is the principal morbid phenomenon observable, the chief aim of the physician must be to ascertain the cause and nature, and then to remedy the disorder existing in that system.

Uterine Neuralgia (Hysteralgia, Irritable Uterus).—Painful affections of the womb, unassociated with what is called "organic" disease, are very common, and have attracted a large share of professional attention. Since Dr. Gooch's famous discovery and description of the "irritable uterus," this troublesome and often, hitherto, intractable malady has obtained general recognition as one of the most notable among the many diseases to which women are liable. As rightly observed by Dr. Ashwell,—"A narrative of the symptoms of painful menstruation, in its neuralgic form, would, with slight alterations, suffice for irritable uterus," as first described by Dr. Gooch. In fact, those sufferers from difficult and painful menstruation, who also experience uterine pain in a more or less subdued form during the menstrual intervals, are victims of irritable uterus. It is most frequently observable in women above twenty-five years of age, and occurs probably quite as often in married as in unmarried women. Pregnancy rarely happens during its continuance, and it is especially prevalent during the closing years of the menstrual epoch.

The pain may be correctly described as lumbo-uterine; for, while it generally spreads across the lower part of the back, and around the pelvis, and not unfrequently extends along the thighs even to the knees, its chief and permanent seats are the lower third of the spinal cord, and the part of the abdomen immediately above the pubis. In almost every case the pain is extremely intense, and in many cases is a perfect agony during the menstrual periods. In the intervals the pain, though generally subdued and tolerable, is capable of being excited to a surprising extent by slight causes, such, for example, as walking, riding, going up stairs, the jolting of a carriage, or mental emotion; and, in very severe cases, merely sitting up, or standing for a short time, will induce a sudden access of pain. I have frequently known it to be brought on by the act of defæcation, and even by that of micturition.

* *Ibid*, p. 576.

Besides these symptoms which are most commonly met with, several others are frequently associated with uterine neuralgia. Among them, and especially characteristic, is a group of phenomena closely resembling those of inflammation in what is commonly called its chronic form : there is marked tenderness evinced by pressure over the hypogastric region ; examination *per vaginam* is often almost impracticable, and pressure on the mouth of the womb will probably prove so intensely painful as to cause the patient to shriek ; more or less throbbing, a certain sense of fulness and of heat beyond the normal degree is experienced, and, if the speculum be used, the cervix uteri is seen to be somewhat tumid or puffy, and redder than natural. There is often, also, hyperæsthesia and tendency to spasm, of the vagina, and, in a considerable portion of cases, coition, if at all bearable, is attended with great pain. Leucorrhœa is a remarkably constant concomitant, the quantity and quality of the discharge being, however, very variable ; the catamenia are generally deficient in quantity—they usually recur irregularly, are most frequently retarded, and, when present, are apt to be intermittent. In very severe cases a false membrane, sometimes forming, when passed entire, a fairly accurate cast of the interior of the womb, is discharged. Sometimes this membrane is passed in fragments, and much time elapses, and intense suffering is experienced, before it is wholly got rid of ; and, in some cases, evidence seems to show that, within a very short period, two or more membranous exudations occur in succession. Bearing-down pains and a sense of weight in the pelvis are very commonly complained of ; the womb generally sinks down, more or less, into the vagina, and in a considerable portion of cases *prolapsus uteri* is a pronounced symptom. Extremely troublesome frequency of micturition is very common, the urine being generally copious and pale, but sometimes decidedly high coloured, and occasionally having a strong characteristic odour. There is often considerable derangement of the digestive function : the appetite is apt to be capricious, and nausea, or even vomiting, not unfrequently occurs. The bowels are generally constipated, and flatulence, often to a very distressing extent, is a prominent symptom. The anus is apt to be spasmodically constricted. The peripheral circulation is often astonishingly irregular, a condition manifesting itself by alternate shiverings and flushings, by headache, feverishness at night, and, of course, unrefreshing sleep. If the disorder has existed a considerable time, the physician may confidently predict the existence of great tenderness of the spine, especially along its lumbar and lower dorsal segments—tenderness which will be quickly manifested if slight pressure be made upon it, and which is often accompanied by tenderness along the whole

spinal region, but especially between the scapulæ, and by general hyperæsthesia of the spinal region.

In the foregoing description I have attempted to represent as accurately as I can, within the brief space prescribed to myself, a typical case of "irritable uterus," but such cases are less frequently met with than those forms of uterine neuralgia in which the phenomena of inflammation, or resembling those of inflammation, are not observable. In these more ordinary cases, a more or less abiding sense of painful bearing-down during the intervals of the catamenia is the principal evil complained of, the other symptoms being similar in nature, but manifesting themselves in less pronounced forms. Moreover, of course, some of them only are present in one case, some in another; and though the menses are, as a rule, irregular and deficient, some cases occur in which they are almost continuous, but slight, and some also present themselves in which menorrhagia, accompanied by marked pallor and anæmia, proves a serious complication. Sometimes the menstrual discharge is inducible at almost any period by various and very slight causes. Dr. Lee says,—"If the disease continues long, and the powers of the system are much impaired, it is entirely interrupted."* I have met with no case of uterine neuralgia in which menstruation was wholly absent, but I have met with cases in which there was no leucorrhœa. Constipation of the bowels, so generally present, may be replaced by chronic diarrhœa, and not unfrequently the two disorders alternate with each other. Occasionally, uterine neuralgia may come on by transference from some other part. Dr. Tyler Smith has mentioned a case published by Dr. Handfield Jones,† "in which frontal neuralgia and ague continued until puberty, and were then replaced by 'irritable uterus.'" Of course, the malady very often occurs as a result of reflex action. An instructive case of this kind is reported by Professor Bedford, of New York‡:—Mrs. H., æt. twenty-three years, the mother of one child three weeks' old, complained of great distress in her womb whenever she allowed her infant to suck. She had been married about eighteen months; had always been a healthy woman, and never suffered from pain in her womb before the birth of her child. The pain left her on each occasion when the child finished sucking, and, as time advanced, it became less severe. It is probable that in this case the slight reflex cause of the neuralgia—viz., the child's irritation of the nipple—would not have sufficed to produce the

* "Clinical Reports of Ovarian and Uterine Diseases, with Commentaries." By Robert Lee, M.D., F.R.S. London: 1853, p., 122.

† "Clinical Observations on Functional Nervous Disorders," p. 457.

‡ "Clinical Lectures on the Diseases of Women and Children." New York: 1856, p. 316.

pain had not the womb been in that state of excessive sensibility, consequent on parturition, only a short time before the pain was induced. We know that, as a general rule, suckling speedily after the birth of the child causes a perceptible reflex influence on the womb, and promotes or completes its contraction—pain, more or less severe, being in many cases associated with the process.

The pathology of irritable uterus or uterine neuralgia has engaged a large share of professional attention, but has received, as it seems to me, no corresponding amount of elucidation. "What is the nature of the irritable uterus?" inquires Dr. Gooch. "It is not acute inflammation; for that would run a far shorter course, and end in certain known consequences. It is not chronic inflammation; for that is a disorganising process, and slowly but surely alters the structure of the organ in which it goes on. Both in chronic inflammation and in the disease which I am describing, there is a morbid state of the nerves, indicated by pain, and, sometimes, at least, a morbid state of the blood-vessels, indicated by their fulness; but the substances effused by chronic inflammation show that in this there is something additional in their actions, and, consequently, in the state of the vessels. The disease which I am describing resembles a state which other organs are subject to, and which in them is denominated irritation. Thus, surgeons describe what they call an irritable tumour of the breast. It is exquisitely painful; an ungentle examination of the part leaves pain for hours; it is always in pain, but this is greatly increased every month, immediately before the menstrual period. Although apprehensions are entertained of cancer, it never terminates in disease of structure. It is represented as a very common disease. Mr. Brodie describes a similar case in the joints. It occurs chiefly among hysterical females; it is attended by pain, at first without any tumefaction, but the pain increases, and is attended with a puffy, diffused, and trifling swelling; the part is exceedingly tender. This assemblage of symptoms, lasting a long time, and being often a little relieved by remedies, occasions great anxiety, but there never arise any ultimate bad consequences. 'The disease,' says Mr. Brodie, 'appears to depend on a morbid condition of the nerves, and may be regarded as a local hysterical affection.' These painful states of the breast and of the joints appear to be similar to that which I have been describing in the uterus; similar in kinds of constitutions which they attack; similar in pain, in exquisite tenderness, in resemblance to the commencement of organic disease, and in proving ultimately to be only diseases of function."

Dr. Robert Lee, who quotes the above passage, says,—"Dr. Dewees, whose attention has been particularly directed to the

pathology of this affection, does not consider this view of the subject correct, and it is certainly very difficult to discover any analogy between a tumour of the female breast, or joints, and an affection of the uterus, depending solely upon a morbid state of its nerves."* Dr. Lee regards the disease in question as "chronic congestion and inflammation of the uterus." Dr. Ashwell held a like opinion. Referring to Dr. Gooch's doctrine, which, he says, requires "more proof than has hitherto been adduced," he adds—"This accurate observer founded his views on analogy, and on the lengthened period of ten years, during which, having carefully watched the progress of certain cases, he found the uterine organization still unaltered. The analogical part of the opinion is unsatisfactory, and must remain so till the nature of hysteria is developed, and till the affections from which this pathology is deduced are more clearly proved to be not at all dependent on inflammation. That the disease in question should be regarded as a modified inflammation of the cervix uteri, is a view, not only in accordance with symptoms, but with the results of the most successful treatment. It is difficult to understand that there shall be redness, which I have several times seen by the speculum, heat, permanent pain, and tenderness of the neck of the uterus, a glandular part, without believing that its vascular and nervous structures shall have undergone some change."† The question at issue is, after all, simply a question of fact: Dr. Gooch, while freely admitting that, in one class of cases of irritable uterus, "congestion is an essential part," also maintains the existence of another class of cases in which no sign of congestion or inflammation is discoverable. We know quite well that pain of the most agonizing kind, persisting, with but slight intervals of relief, for years, and associated with extreme sensitiveness and tenderness—evinced by pressure on the affected part, may manifest itself in various parts of the body without any congestion or sign of inflammation; now, the recognition of this fact should, I think, not only remove any, *prima facie*, difficulty in admitting the possibility of protracted uterine pain unassociated with inflammation, but should, in fact, lead us to surmise the existence of such pain; and, indeed, its existence is affirmed by several competent observers. Professor Bedford, commenting on a case of what he calls "neuralgia of the cervix uteri," makes use of these words:—"On an examination, *per vaginam*, I have recognized no change whatever in the position or structure of the uterus; the organ is in all respects natural, except in one par-

* "Clinical Reports." 1853, p. 123.

† "A Practical Treatise on the Diseases Peculiar to Women." By Samuel Ashwell, M.D. London: 1845, pp. 244-5.

ticular—in pressing with my finger on the os uteri the patient complains of suffering." He adds,—"I have satisfied myself, by this mode of exploration, that the case before us is what is termed neuralgia of the neck of the womb, an affection oftentimes mistaken for some other disorder; *and there is no disease with which it is more likely to be confounded than chronic congestion of the uterus.* Uterine neuralgia is sometimes symptomatic of disease of the uterus, such as enlargement, ulceration, &c.; sometimes, also, of displacement. Again, it will occasionally present itself as a primary affection *entirely unconnected with any lesion of structure.*"* This statement I fully endorse, and I am confident that the views of the subject first formally propounded by Dr. Gooch are essentially correct. Moreover, a due consideration of the pathology of neuralgia explained in this volume will, I believe, afford a ground of conciliation of his views with those of the eminent physicians to whose criticisms I have just adverted. For, by the light of that pathology, we see that in cases of neuralgia the symptoms of inflammation may be present as collateral or secondary phenomena, that they may appear in any case, that they ought to be carefully looked for in every case, and that in a large proportion of cases they are more or less decisively perceptible. Dr. Gooch needlessly weakened his own argument, and strengthened that of his adversaries, when he maintained that all the symptoms of inflammation of the uterus may be present without the existence of inflammation. He assumed this position because, while holding with other pathologists of his time that acute inflammation runs a short course, and that chronic inflammation is a disorganizing process, he found that, as a matter of fact, neither of these conditions is represented by the disease he called "irritable uterus," which, as a rule, neither runs a short course nor "is a disorganizing process," but which, nevertheless, is often associated with symptoms of inflammation. Had he understood what is the *rôle* of the nervous system in the production of all forms—and, what he deemed, semblances—of inflammation, he would have dismissed the idea that chronic inflammation is, *necessarily*, "a disorganizing process"; and, so far as the question of inflammation is concerned, would simply have divided cases of "irritable uterus" into two classes —those presenting symptoms of inflammation, and those not presenting them.

The existence of uterine nerves was first demonstrated by Tiedemann, who published figures of them as he saw them in the case of a woman who died six days after delivery; but his description gives no adequate idea of the large extent to which

* "Clinical Lectures on the Diseases of Women and Children," p. 478.

the womb is actually innervated. Our present knowledge of the neural anatomy of that organ is mainly due to the elaborate researches of Dr. Robert Lee, and knowing as we now do, by his aid, not only that it is abundantly innervated, but also the mode of its innervation, we understand its physiology far more completely than before, while the flood of light cast on its morbid processes by what has been ascertained of its neural anatomy and physiology has inaugurated a new era in the history of uterine pathology. The amount of Dr. Lee's contribution to it may be most fitly stated in his own words. "I have demonstrated," he says, "that the human uterus possesses a great system of ganglia and nerves, connected with the sympathetic and spinal cord, which enlarges with the coats, blood-vessels, and absorbents during pregnancy, and which returns, after parturition, to its original condition before conception takes place. It is chiefly by the influence of these ganglia and nerves that the uterus performs the varied functions of menstruation, conception and parturition, and it is solely by their means that the whole fabric of the nervous system sympathises with the different morbid affections of the uterus. If these ganglia could not be demonstrated, its physiology and pathology would be completely inexplicable. . . I have demonstrated that every artery distributed throughout the walls of the uterus and heart, and every muscular fasciculus of these organs, is supplied with nerves upon which ganglia are formed.

"In amenorrhœa, chlorosis, dysmenorrhœa, menorrhagia, hysteria, hysteralgia, sterility, all the functional disorders of the unimpregnated uterus, and, in many of the diseases of the gravid uterus, the slightest reflection on the symptoms would lead us to conclude that these are nervous diseases. The local and constitutional phenomena of these diseases would be inexplicable, if we did not know that the uterus has an extensive system of ganglia and nerves, great nervous centres, connected with the spinal cord. The treatment of these diseases cannot, without this knowledge, be conducted upon sound physiological and pathological principles."* The existence of the uterine system of nerves is now becoming generally recognized, and the reality of Dr. Lee's discoveries, as described by himself, has been, more or less completly confirmed by the results of the independent researches of Tiedemann, Müller, Herschfeld, Boulan, and other inquirers in this important field.

But though, as Dr. Lee rightly observes, without a knowledge of the extensive system of ganglia and nerves of the uterus, "its physiology and pathology would be completely inexplicable," I am not aware that either he or any other physician has explained

* "Clinical Reports." 1853, p. 144.

the precise *modus operandi* of those ganglia and nerves in effecting those numerous processes of the uterus comprised within the wide range of both its physiological and pathological functions. In so far as the pathology of irritable uterus, and of its associated disorders, is concerned, I shall, therefore, attempt to explain in detail here what the *rôle* of the nervous system is, and will, in the first place, recur to the discussion of the question of the nature and significance of the symptoms of inflammation often present in cases of "irritable uterus."

The presence or absence of these symptoms in any given case of uterine neuralgia is determined, according to the pathological views already expounded, by the conditions of those nervous centres immediately presiding over the textural nutrition, as well as over the blood-supply, of the womb: if the energy and excitement of the nutritive (positive-motor) nerve cells be predominant, the nutritive processes will be so intensified and augmented as to constitute uterine inflammation of some grade.* If, on the contrary, the energy of the vaso-motor (negative-motor) nerves be predominant, those processes will be relatively in abeyance, and the uterine arteries will be so contracted as, in fact, to produce uterine anæmia of some grade as a concomitant of the neuralgia; and, in either case, the condition mentioned being once established in the nervous centres in question, may, with slight fluctuations, persist for years; and hence, if the force of the positive-motor nerves be relatively the greatest, the phenomena of inflammation may, and indeed will, be equally persistent, and yet the intensity of the process may be so subdued as to cor-

* The potency of nerve-force in relation to textural nutrition is well exemplified in a case of neuralgia of the face, recorded by Dr. Handfield Jones, in which severe paroxysms of the disease "issued in actual extravasation of blood in the eye and cheek. The pain would continue very severely for forty-eight hours, then begin to remit, and, at the same time, a blush would appear in the part, which increased until there was actual effusion of blood." In connexion with this interesting case, Dr. Jones mentions that "Dr. Cahen has recorded (*Arch. Géner.*, Oct., 1863) two cases showing the influence of ileo-lumbar neuralgia on the occurrence of uterine hæmorrhage." (*a*) Dr. Jones, and, if I understand him rightly, Dr. Cahen, also, regards these and like cases as evidence of enfeeblement or paresis of the vaso-motor nerves distributed to the affected parts. I am constrained, however, to dissent from this interpretation of those instructive facts. I look upon them as evidence of preternatural energy in the cerebro-spinal nerve-cells related to the affected parts—energy so potent as to cause the constituent elements of the affected tissue to attract blood faster than they could assimilate it through the peripheral arteries, notwithstanding that those arteries were more or less vigorously contracted by vaso-motor energy.

(*a*) "Clinical Observations on Functional Nervous Diseases," pp. 4-556.

tinue for years without effecting any disorganization. If these two forces are fairly balanced they may, I apprehend, be morbidly intense without producing in the womb perceptible organic change of any kind.

Having shown that the presence of congestion or inflammation in cases of irritable uterus is no bar to the consideration of such cases as essentially neuralgic, and that, on the contrary, congestion or inflammation is likely to occur as a concomitant or secondary affection in a certain proportion of cases of uterine neuralgia, I now proceed to explain the symptoms of the malady *seriatim*.

Pain is, of course, as the name—neuralgia—implies, the chief feature of the disease. That the sensory nerve-cells related to the womb, and affected in these cases, are cerebro-spinal is a proposition which may be admitted for the three following reasons:—(1.) It has been ascertained, anatomically, that cerebro-spinal nerve fibres are distributed to the womb; (2.) prolonged uterine pain is generally accompanied not only by backache, but also by tenderness (evinced by pressure) along the lower part of the spine; (3.) consciousness of pain in the womb is impossible without the intervention of cerebro-spinal nerve fibres. Admitting this proposition, we are led at once to the conclusion that the chief seat of the uterine sensory nerve-cells is in the lower segments of the spinal cord. The chief point of morbid sensibility in the spinal cord in cases of uterine diseases, as well as in cases of disease of the male genital organs, I find to be about the junction of the dorsal with the lumbar vertebræ. Now, if these statements, as well as the general explanation of the nature of pain already given, be correct, it is evident that uterine pain may be induced by any agency capable of causing irritation, and consequent hyperæmia of that segment, or those segments, of the spinal cord containing the uterine sensory nerve cells; and, if so, the conclusion is legitimate that pain referred to, or localized by consciousness in, the womb may originate quite independently of any perceptible change in that viscus, and indeed in cases in which it is structurally and, but for the pain, functionally healthy. In short, the *proximate* cause of uterine neuralgia as, in fact, of all uterine pain, is hyperæmia of those segments of the spinal cord just indicated.

Dysmenorrhœa is the symptom next in importance to that of pain—in fact, pain is generally considered as being one of the elements of dysmenorrhœa. Certain it is that, in cases of uterine neuralgia, the pain, which during the menstrual intervals is, at all events, bearable, is so greatly increased and intensified during the menstrual process as, in many cases, to become a perfect agony. I will, therefore, premise a few words concerning this augmented pain. I incline to believe that two causes may be assigned for it

—that in some cases it may be mainly due to one of those causes, in others to the other, and that in still other cases each of the two may be equally operative. (1.) During the menstrual period, which corresponds with the period of rut or heat in animals, there is a great afflux of blood, and, consequently, a tumultuous increase of nervous energy in those nerve-centres functionally related to the reproductive organs. The result is a great increase of vigour and intensity in the activity of those centres; and, of course, those of them which are sensory, feeling, as they do, with augmented acuteness, transform, in cases of dysmenorrhœa, the bearable pain, of which these were previously the factors, into the agony often associated with that malady. (2.) The second of the causes now adverted to is only a twin branch, with the one just mentioned, of a common stem: in the same way as the function of the uterine sensory nerves becomes exalted, so also does that of the uterine motor nerves, and hence the vigorous and often exceedingly painful contractions of the muscular substance of the womb. Now, these strong, slow, and involuntary contractions are of the nature of cramp, and causing pressure, as there are good reasons for believing they do, on the peripheral extremities of the uterine sensory nerves so irritate them as to induce severe pain.*

But though pain is a constant element of dysmenorrhœa, and the one which commands by far the most attention, *difficulty* of menstruation is the characteristic of the malady implied by its name, and, in fact, this difficulty is two fold: there is difficulty in secreting the menstrual fluid into, and difficulty in discharging it out of, the womb. The nerves (positive motor) causing the secretory action of the uterine mucous membrane are, indeed, functioning with preternatural vigour, but they lack an adequate blood-supply from which to withdraw into the womb by the agency of that membrane, the normal menstrual fluid—normal alike in quantity and quality. That adequate blood-supply is withheld by the uterine vaso-motor (negative motor) nerves, which also functioning with preternatural vigour effect the more or less complete closure of the uterine arteries. Hence the difficulty in secreting the menstrual fluid, and its characteristic scantiness. The difficulty in discharging the small quantity which is secreted, and the fact that a considerable proportion of that small quantity is often discharged in successive clots, are both due to the preternatural contractile energy of the womb itself. Instead of allowing the fluid to pass quickly away as fast as it is secreted, the excited womb violently stimulated by the nerves distributed to its muscular substance, closes its orifice with spasmodic energy,

* Concerning the production of pain by intense muscular contractions, see the end of Chapter III., the whole of Chapter IV., and p. 69 et seq.

and thus shuts within itself, more or less completely, the fluid effused which, therefore, having slowly accumulated, exerts distending pressure on the uterine walls, and, at length provokes, by reflex action, such violent contractions as to effect at once the complete discharge of its contents by its expulsive efforts. If the quality of the fluid be such as to enable it to clot, or to be formed into a clot, its enforced accumulation in the womb favours and aids this process ; and when it is accomplished, the expulsion of the clot involves the necessity of uterine action so vehement as to resemble very closely the throes and, indeed, in some cases, even the agonies, of labour. This remarkable phenomenon is, unhappily, a by no means uncommon characteristic of severe dysmenorrhœa.

Intimately associated, physiologically, with the symptoms just discussed is the kind of inflammation characteristic of irritable uterus : the mode of origin of this inflammation, and the determining causes of its presence or absence, have already been sufficently explained in the paragraphs criticising the divergent pathological views on the subject. I therefore pass on to the consideration of that very interesting pathological phenomenon frequently accompanying dysmenorrhœa—viz., the formation and expulsion from the uterus of what is called a 'false' membrane. The immediate cause of the formation of this membrane is, I venture to assert, the intensely preternatural energy of the nerve-force distributed to the uterine mucous membrane, and presiding over its normal, as well as over its abnormal, actions. That glands and glandular surfaces (mucous membranes for example), secrete at the bidding of, and by virtue of energy derived from, the nervous system, is a proposition of the utmost possible importance by way of elucidation of the origin of the false membrane in question, as well as of a symptom next to be discussed, and the truth of this proposition I regard as fully established. Now, I have already shown that in cases of dysmenorrhœa there is great hyperæmia of the nervous centres related to the womb —hyperæmia so great as to be morbid by virtue only of its intensity. During pregnancy there is also a like hyperæmia, but it is due to a normal cause, and results, in so far as the uterine mucous membrane is concerned, in a normal product—the decidua. In dysmenorrhœa there is a similar, but less perfectly constituted, membrane, and formed in the same way. In both cases, excessive and intense action of the nerve-force distributed to the mucous membrane supersedes its ordinary function of secreting mucus, and causes it, instead, to effuse plastic lymph : this is speedily organized, in cases of pregnancy, into the decidua ; and, in cases of dysmenorrhœa, into an abortive likeness of it—the false, or dysmenorrhœal, membrane. The view here expressed concerning

the nature and mode of origin of this membrane differs from that generally held by the eminent pathologists who have concerned themselves with this subject only in respect to the nature and mode of action of the force by which it is produced. Most, if not all, of them regard it as a consequence of inflammation. "We shall probably be correct," says Dr. Montgomery, "in referring such productions to any cause capable of exciting a certain degree of irritation, or perhaps of inflammation, by which a thin lamella of the lining membrane of the uterus may be cast off, or lymph poured out on its surface, which assumes a membranous texture, as we find happen in other hollow organs lined with a mucous membrane, as, for instance, in the intestines in cases of diarrhœa tubularis, and in the trachea and air-tubes; to use the words of Pouchet,—'Ce n'est q'une desquamation de sa superficie, analogue à celle qui se produit à la surface des autres muqueuses, mais plus intense;' and hence we the more readily acquiesce in the belief that such concretions may form, quite independently of the specific stimulus of conception or of sexual intercourse, an opinion which is sanctioned by the experience of the best authorities."* In this view I entirely concur; but, while assenting to the doctrine that the dysmenorrhœal membrane is formed in the manner described in this passage, I supplement that doctrine by the important addition—viz., that the membrane is so formed solely by formative power exerted by the nervous system. It is incumbent on me to insist with especial emphasis on this supplementary doctrine because, while opening a new field of pathology, it reveals for the first time in the history of the discussion of this subject the therapeutical principle which can alone guide us to a really scientific and successful treatment of the malady in question.

Having adverted to the sanguineous clots, as well as of the membrane just mentioned, I may point out that when both processes take place in the same patient, effusions of lymph and of blood may occur alternately, and that, in such cases, the patients may expel what have been described by Dr. Montgomery as "solid substances of a fibrous appearance externally, and varying in size, from that of a fig to that of an almond, which they resemble in form, being in fact moulded to the shape of the uterine cavity. These substances, when cut into, are found to consist . . . of layers of coagulum, between which there is interposed a thin, membranous-looking stratum of lymph; and others, again, are a combination of coagulated blood with the membranous production first described, around which blood is effused and condensed before its expulsion from the uterus, in which case, when

* "An Exposition of the Signs and Symptoms of Pregnancy, with some other papers connected with Midwifery." By W. F. Montgomery, M.D. Second edition, pp. 272-3.

a section is made through the centre of the mass, it is found to consist of an outer coat of condensed coagulum lined by the membrane, the smooth surface of which is thus laid open" (pp. 271-2).

Leucorrhœa, as is well-known, is an almost constant accompaniment of uterine neuralgia; and the explanations which I have already given will have fully prepared my readers for the announcement that this malady is really of nervous origin, and that it consists in nothing more than an abnormal augmentation of a normal process, viz., the secretion of mucus which, whatever be its quantity, is eliminated from the blood by the mucous gland-cells only when they are stimulated to action by nerve currents passing along nerve fibres, generally, at all events, of cerebro-spinal origin, fibres directly innervating the gland cells, and conferring upon them their peculiar power, while attracting blood to themselves, of extracting from it the fluid they secrete. The function of the sympathetic in relation to glands is, I hold, merely vaso-motor or, through its action on the arteries distributed to the glands, regulative of their blood supply. Now, in reviewing the symptoms already mentioned as associated with uterine neuralgia, I have shown that they are all referable to hyperæmia, and, therefore, exalted function of the nervous centres governing the womb; and if the mucous glands work only by the agency of the nervous force and mechanism just described, it is evident that the vigour with which they work will be proportionate to the energy conveyed to them, and that if the nervous centres governing them are hyperæmic—as, in cases of uterine neuralgia, I have shown them to be—it is obvious that leucorrhœa is simply a result and expression of such hyperæmia. I am aware that this doctrine is revolutionary of the prevailing ideas and practices of the profession in respect to leucorrhœa, and therefore that powerful evidence will be necessary in order to substantiate it; this, however, I shall give, in the shape of a considerable number of cases proving that by exerting a sedative influence on the nervous centres related to the reproductive organs leucorrhœa is rapidly cured. I may add here that, though my explanation of the *mode of action* of the nervous system in producing leucorrhœa may be new, the conception that the nervous system does produce it is not new: it was expressed by Mr. Teale in 1829,* by Dr. and Mr. Griffin in 1844,†

* "A Treatise on Neuralgic Diseases Dependent upon Irritation of the Spinal Marrow and Ganglia of the Sympathetic Nerve." By T. P. Teale. 8vo. London: 1829.

† "Observations on the Functional Affections of the Spinal Cord and Ganglionic System of Nerves, in which their Identity with Sympathetic, Nervous, and Irritative Diseases is Illustrated." By William Griffin, M.D., and David Griffin. 8vo. London: 1844.

and subsequently by several pathologists: in his "Clinical Lectures," published in 1856, by Professor Bedford, he says,—"The interesting tables of Marc D'Espine show very conclusively that a discharge of mucus from the vagina, more or less profuse, will be occasionally observed, constituting a species of leucorrhœa, dependent exclusively, as has been proved, on a peculiar irritation of the uterine nerves. . . . This important principle in uterine pathology has been fully discussed by Reclam, Mitchell, Malgaine, Beau, and others; and assuming it as a basis for their therapeutics . . . they have treated, and successfully, too, this particular form of uterine catarrh consistently, viz.: through revulsive agents applied to the lower portion of the spine, such as blisters, cauterisation with the red-hot iron, &c." Professor Bedford prefers "the insertion of a nitric acid issue on the side of the lumbar vertebræ," because, among other reasons, it "is more positive in its action than blisters." The fact of the notably slow spread of the doctrine of the nervous origin of leucorrhœa is, perhaps, partly accounted for by the unwillingness of patients to submit to these questionable and very uncomfortable remedies, and partly, I would fain hope, by the unwillingness of physicians to prescribe them.

Another collateral, very common, and often very distressing, symptom of uterine neuralgia is prolapsus uteri, and many patients complain especially of bearing-down pains. Dr. Handfield Jones begins his chapter on "Uterine Neuroses" with these words,—"The uterus seems to come in for a fair share of neurotic disorder. This, indeed, might be expected, not only from its functional importance, and its extensive sympathetic connections, *but from the marked depression of nervous power with which its monthly evacuation seems to be almost constantly associated.*"* And, again, in his account of the case, which he numbers 153, and in which the patient complained of "violent pain at lower part of abdomen and bearing-down," he remarks,—"In this case the affection of the sensory nerves was complicated with paresis of the vasomotor." It will be seen that this physician's view of the state of the nervous power, related to the womb during the menstrual period, is diametrically opposed to that which I have expounded, and I must now add that though, at first sight, his explanation of the "bearing-down" in the case just mentioned—viz., that it was due to nervous paresis—seems thoroughly reasonable, it is in fact, as I am prepared to prove, erroneous, and the very opposite of the truth. Bearing-down or prolapsus of the womb in cases of uterine neuralgia, and, indeed, in a large number of other cases, is immediately due to extreme contraction of the arteries supplying blood to the uterine ligaments, as well as to the uterus

* "Clinical Observations on Functional Nervous Disorders." 1864, p. 453.

itself. This contraction shuts off the blood to such an extent as to produce marked anemia, and consequent feebleness of those ligaments which, becoming relaxed, permit of the prolapsus in question. This hypothesis I must also leave in this place without proof, begging my readers to suspend their judgment in the matter until they have read the evidence which I shall afterwards supply in the shape of a record of cases demonstrating the truth of my statement; meanwhile, I may say here that I have repeatedly proved that, by increasing the circulation of blood in the pelvic viscera, the prolapsus in question disappears. Now, if the explanation just given be correct; if, in fact, the immediate cause of the prolapsus be undue contraction of the arteries of the womb and its appendages; and if, as we know, such contraction is itself caused by preternatural energy of the vaso-motor nerves distributed to those arteries, it is certain that the real cause of this prolapsus is hyperæmia—instead of anæmia, and consequent paresis—of the vaso-motor nerve centres in question.

There are a few other symptoms occasionally presenting themselves along with uterine neuralgia which I shall be able to dispose of in a few words. The tenderness of the vagina and intolerance of coition occasionally complained of are obviously referable to the condition of the nervous centres already insisted on. When inflammatory symptoms are present the tenderness in question is likely to be most acute; but intense hyperæsthesia, of course referable to hyperæmia of the sensory nerve centres only, is quite sufficient to produce both intolerable sensitiveness of the vaginal walls and that vehement spasm of the same, to which Dr. Marion Sims has especially called the attention of the profession under the name of vaginismus. The frequent micturition and pale and abundant urine, also often associated with uterine neuralgia, are symptoms dwelt upon in the section on renal neuralgia, and are there shown to be referable to the same cause as the symptoms discussed above. Sickness, nausea, and capricious, enfeebled appetite, as well as constipation and flatulence, I have proved to originate in hyperæmic disorder of the spinal cord, and collateral sympathetic ganglia; and, whatever may be the remote cause, the proximate cause of the shivering, flushing, and feverish nights frequently complained of by sufferers from "irritable uterus" or uterine neuralgia consists not less certainly in alternate hyperæmia and anæmia (the latter a result of re-action) of those nervous centres.

Vaginal Neuralgia as an independent and well-marked affection is not, so far as I know, a common trouble, although irritation and fugitive pains, more or less severe, are often experienced. It occurs most frequently along with some other and more grave

disorder within the pelvic region, and when symptomatic of such disorder it is prone to be continuous, and not intermittent, as it is more likely to be if an independent malady. In some cases there is also an extraordinarily great amount of hyperæsthesia, and when this is present the gentlest possible digital examination induces instant contraction and, it may be, spasm, lasting a considerable time, of the vaginal muscular fibres, so that the vaginal cavity becomes more or less completely obliterated. In these cases, if sexual intercourse is possible at all, it is very painful; cases also occur in which an attempt to effect such intercourse induces an attack of convulsions. This unfortunate malady, more or less severe, sometimes causes great domestic unhappiness; and, if conjugal estrangement does not ensue from it, it may render the patient herself permanently unhappy, because she finds it impossible to fulfil her duty as a wife. Leucorrhœa and backache are concomitants of vaginal neuralgia in the majority of cases. The pathology of this affection is rendered perfectly intelligible by the preceding discussion on uterine neuralgia; I shall therefore make only one remark respecting it, viz., that the spasmodic contractions of the vaginal muscles, induced by physical contact, are a phenomenon of reflex action, which can only take place through the agency of the nervous centres functionally related to the vagina, and point, therefore, unmistakeably, along with the other symptoms of the disorder, to its real seat in those centres.

The marked tenderness of the lower segments of the spinal cord almost invariably existing in chronic cases of neuralgia of any of the pelvic viscera, while itself an evidence of disordered circulation and nutrition bordering on inflammation in the tender part, is, at the same time, striking testimony to the truth of the general doctrine here contended for, viz., that not only ovarian, uterine, and vaginal neuralgia, but the several symptomatic disorders above mentioned, some of which are generally associated with those diseases, are also of nervous origin, have their seat in the nervous centres functionally related to the reproductive organs, and consist essentially in preternatural energy due to morbid irritation and consequent excess of blood in these centres.

CHAPTER VII.

PAINFUL EXCITABILITY OF THE SPINAL CORD.

THE disorder which I am about to discuss is one which it is very difficult to name correctly: no name that I have met with, and none that I can think of, fairly describes the disease. It is often called hysteria, but is, perhaps, most generally known by the term Spinal Irritation—a term first given to it by Dr. Thomas Brown, of Glasgow, who referred a great variety of symptoms, including neuralgia and some disorders of the stomach and bowels, to this affection.* This phrase is, however, objectionable, because, even if the word irritation be a convenient one, it is not irritation of the spine, but of the spinal cord, which is in question, and it seems to me that, inasmuch as the name "spinal irritation" is not yet so generally accepted as to be unchangeable, it is desirable to denote the malady to which it has been applied by some phrase more unmistakeably indicative of its nature than "spinal irritation" is. Romberg, referring to this malady, uses the name "Spinal Neuralgia," which is open to the objection that, while it correctly denotes pain in the neighbourhood of, or along, the spinal column, does not necessarily express the idea of pain seated in the spinal cord itself, as the term headache expresses the idea of pain seated in the brain. And even if it did, it would still only represent very inadequately that morbidly excitable condition of the spinal cord which is the essential feature of the malady in question. The term spine-ache is objectionable for much the same reason as is spinal irritation; and though the term back-ache is commendable because it is a good homely phrase which every one understands, and which is commonly applied by patients suffering from the malady in question to the pains which they actually experience, and though it is not open to the objection to which spinal irritation and spine-ache are liable, it is objectionable because it conveys a meaning of too restricted a character to be capable of fairly denoting the wide range of the disorder to be indicated. Pain in the back, if limited to only one vertebral segment, or to one part of the spine,

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* Dr. Brown first explained his views on the subject in an Essay which he read to the Glasgow Medical Society in January, 1823.

is rightly called back-ache; but the term needed is one which will denote a peculiar susceptibility of, and strong tendency to reflect, physical and psychical impressions, as well as a remarkable proneness to pain in every segment of the spinal cord. For these reasons I am disposed to discard each of the terms mentioned, and to adopt the name—*painful excitability of the spinal cord.* This name, while fairly expressing what each sufferer from the disorder experiences, does not imply any foregone conclusion concerning its pathology, an advantage which will be appreciated by those of my readers who bear in mind the great divergence of opinion still prevalent concerning the proximate cause of the disease.

In discussing the several forms of neuralgia in the course of the two immediately preceding chapters, I have frequently adverted to tenderness of those special segments of the spinal cord related to the nerves affected in each case: now the malady at present under discussion is, in fact, an extension more or less complete to the whole of the cord of that condition which in cases of neuralgia is mainly concentrated on one segment, and is only diffused in a subdued form a short distance above and below it, the disorder being less and less appreciable as pressure is made at increasingly greater distances from that segment; and inasmuch as the disease in question may involve a great part or, indeed, even the whole of the spinal cord, it renders the patient liable, in extreme cases, to every kind of neuralgia already passed in review. In fact, by practising the deductive method of investigation we are enabled, from a consideration of the special functions and relations of *each segment* of the spinal cord morbidly affected, to foretell the existence of neuralgia and its complications in those parts of the body immediately related to it; and, further, we are likewise enabled, from a consideration of the functions and relations of *the whole* of the cord when thus morbidly affected, to deduce and foretell the existence of the whole group of neuralgias and their complications, or all those symptoms which, collectively, are described as phenomena of "spinal irritation." Indeed, this method has already been partially adopted by several authors besides Dr. Thomas Brown, whose essay has just been mentioned. Mr. R. P. Player, of Malmsbury, published a letter, dated December, 1821, in the *Quarterly Journal of Science*, Vol. XII., p. 428, containing the following passage:—"Most medical practitioners who have attended to the subject of spinal disease, must have observed that its symptoms frequently resemble various and dissimilar maladies, and that commonly the function of every organ is impaired whose nerves originate near the seat of the disorder. . . . In a great number, symptoms may be discovered about the origin of the nerves which proceed to the affected parts, or of

those spinal branches which unite with them; if the spine be examined, more or less pain will commonly be felt by the patient on the application of pressure about or between those vertebræ from which such nerves emerge." Precisely similar views were expressed by Mr. John Darwall in a paper published in the *Midland Medical and Surgical Reporter* for May, 1829. In the same year, Mr. Thomas Pridgin Teale, who quotes the authors just mentioned, published his "Treatise on Neuralgic Diseases, Dependent upon Irritation of the Spinal Marrow and Ganglia of the Sympathetic Nerve." In that treatise he elaborated the doctrine already successively promulgated by Player, Brown, and Darwall, and allowed himself to be guided by it to what he came to consider the only rational treatment of the diseases in question. He says,—"The various morbid affections which may be included under the term neuralgia have been too often regarded as actual diseases of those nervous filaments which are the immediate seat of neuralgia, instead of being considered as symptomatic of disease in the larger nervous masses from which those filaments are derived; hence, the treatment has too frequently been ineffectually applied to the seat of the neuralgia, instead of being directed to the more remote and less obvious seat of the disease. . . . I have been still further confirmed in my opinion by the frequent and almost uniform co-existence of tenderness on pressing some portion of the vertebral column, and the circumstance of the tender portion of the spine being in the particular situation where the nerves of the affected part originate" (pages 2 and 4). Mr. Teale's admirable treatise was followed, in 1844, by a still more elaborate and important work, by the brothers (William and David) Griffin, "On the Functional Affections of the Spinal Cord and Ganglionic System of Nerves," in which they rightly observe,—"The spinal marrow is not always a mere inert nervous conductor between the source of disturbance and the distant affections indicative of constitutional irritation, but is itself the part absolutely and immediately thrown into a morbid state, of which these affections are but the symptoms" (preface, p. 6).

Assuming the observations in the last paragraph to be correct, it is obvious that the symptoms of painful excitability of the spinal cord necessarily consist of the aggregate symptoms of the whole of the different kinds of neuralgia already described. This being the case, it will be only necessary here to give a brief summary of those symptoms in order fairly to depict the various and very variable features of the malady in question. The central and most abiding trouble is back-ache, sometimes strictly limited to the spinal region, especially intense at some one or several points of the spine, diffused more or less lengthwise from those points, and most generally radiated laterally to a considerable

extent. Dorsal hyperæsthesia is a very frequent symptom: as observed by Romberg "the most trifling excitement of centripetal nerves, especially of the cutaneous surface, suffices to produce the most violent action"* in some cases; and, in the majority of cases, passing the finger lightly along the surface of the back causes intolerable titillation. Pressure on those parts of the spine where the pain is located most intensely produces great suffering, sometimes amounting to agony. Indeed, many patients of this class have suffered so much from accidental pressure along different parts of the spine that at length they are in constant fear of having their backs touched. Neuralgia in some part or other is almost always present; but though there are certain regions in each case where the pain is more especially prevalent, it is nevertheless remarkable by its extreme mobility. No part of the body seems free from its invasion, and no sooner has the victim's patience been tried to the uttermost in enduring it in one region, than, after a brief interval, it flies to another to begin his tortures afresh. And, what is very curious, the pain in some cases seems to make a regular circuit, attacking several parts in orderly succession, and, having invaded each, beginning again in the same way. In a case, recently under my care, the pain usually began in the lower dorsal region, then ascended to the cervical, then attacked both arms—the left most violently, and ended in the shape of a prolonged torture seated in the integument of the left mastoid process. Most patients exhibit excessive susceptibility to external impressions—the senses being preternaturally acute. Offensive smells and loud or sudden noises are unusually distressing, and mental impressions which would produce no remarkable results in healthy persons often cause in the persons in question tumultuous and not infrequently injurious effects. The majority of patients who have suffered a long time are unable to walk more than a short distance, or indeed to maintain the erect position for many minutes together. There is a general craving for quiet and repose, and this occasionally is so marked a feature as to cause the friends of the sufferers to blame them for needlessly indulging in indolence.

Headaches are in nearly all cases an almost constant trouble: there are few days in which they are not experienced during some part of the day. In some cases they are more prevalent in the morning, in others in the evening, and in the majority of cases are prone to recur with more or less periodical regularity. In women—and most of the patients are women—the headache is greatly augmented during the menstrual period; and not infrequently what is called "sick-headache" occurs, not only at that period, but every week, ten days, or fortnight during the intervals. The sleep is generally insufficient, disturbed, and un-

* "The Nervous Diseases of Man." Vol. I., p. 151. London: 1843.

refreshing; the patients dream nearly the whole time they sleep—the dreams being frequently emotional and sometimes very distressing; and nightmare is very commonly experienced. There is great variability of the mental states: cheerfulness alternates with depression; and circumstances incapable of ruffling the temper of a healthy person will often produce extreme irritation.

Respiration is, in a certain proportion of cases, easily disordered and rendered difficult: asthmatic symptoms are not infrequently experienced, though asthma in its more formidable aspects is rarely observable; slight forms of angina pectoris are common, as is also spasmodic cough often ending in vomiting; and hiccough is a characteristic symptom.

The digestive organs usually exhibit, however, much more disorder than do those of respiration: the appetite is generally impaired and capricious; prolonged nausea is very common, and vomiting by no means infrequent; chronic flatulence and eructations are often complained of; and habitual constipation, with occasional alternations of diarrhœa, is, of all the symptoms, the one which is perhaps the most constant and the most productive of secondary disorders, by reflex action, from the irritating effects of the fæcal concretions.

Functional disorders of the kidneys and bladder have long been noted as peculiarly characteristic symptoms of the malady, as well as of that kindred affection more generally recognised as hysteria: the renal disorder shows itself by the production of an extraordinary large quantity of urine, peculiarly limpid, and of low specific gravity; the disorder of the bladder is manifested by its distressingly frequent contractions, which, in many cases, compel the patient to micturate with extraordinary frequency, both day and night—in some cases in the day time as often as every half-hour.

The female reproductive organs are almost always morbidly affected: difficult and painful menstruation, dysmenorrhœa, and leucorrhœa—in fact, all or most of the symptoms associated with uterine neuralgia—are complained of.

Sudden outbursts of perspiration, sometimes consequent on even slight mental emotion, and often without any apparent cause; an almost habitual feeling of general chilliness, not infrequently culminating in shivering, which is itself followed by flushing; local alternations of temperature; and, also, persistent coldness of the feet, are at once prevailing symptoms and evidences of the great extent to which the vaso-motor nerve-centres are morbidly affected. In a few cases disorders of textural nutrition, limited to some special region, and denoted by serous infiltration into the tissues, and by tenderness of the affected part, are observable.

Morbid phenomena of the muscular system of some grade of intensity are very common—twitchings, jerks, and spasms not in-

frequently accompanying the neuralgias, which are often present; cramps, generally restricted to the muscles of the lower extremities, occur in some cases; and, occasionally, spasmodic contraction of the limbs come on, and persist for hours, days, weeks, or even longer. Dr. Bland Ratcliffe mentions a remarkable case of this kind: during three weeks before he saw the patient—a young married lady—"She had been in bed with her thighs drawn up tightly against her abdomen, and with her heels buried in her nates. This contraction was unremitting during the waking state, and only partially remitting during sleep; it was unattended by pain; and it could be partially overcome, for a time, without causing much pain in the contracted muscles, by slow and steady extension."* The muscles of the face usually exhibit a slight tonic contraction, which gives a rather pinched and rigid aspect to the countenance: this condition, however, not infrequently alternates during short periods of respite from suffering with relaxation of those muscles, and hence the expression of the patient is notable for its great changeableness and variability.

The disease now briefly and imperfectly sketched is not peculiar to women, but, as a matter of fact, almost every sufferer from it is a woman. This circumstance is easily intelligible: the nervous system of woman is far more impressionable, and, therefore, far more liable to disorder, especially of a tumultuous or exciting nature, than is that of man; moreover, there is probably no other bodily organ so peculiarly liable to have its orderly functions disturbed as is the womb, and certainly there is none the functional, as well as structural, disorders of which are comparable to those of the womb in respect to their power of producing morbid reactions, by reflex action, in every part of the nervous system, and through it in every organ of the body.

Those of my readers who are not already acquainted with the fact will, probably, be surprised to learn that the eminent neuro-pathologist, Romberg, denies the existence of the disease just described:—"Owing," he says, "to certain symptoms having received an undue attention, a fantastic caricature has been dragged into neuro-pathology under the name of spinal irritation, which has found, and still finds, the more willing reception among the public, as it seems to hold out a simple and rational mode by which we may explain complex conditions." Having reproduced this "caricature" for the benefit of his readers, he proceeds—"Such is the description given by certain English physicians, who to the present day have failed to achieve a reputation in their native country. It has, however, found its way across the ocean to Germany, with a mass of hasty and untrustworthy observations, and has gained many sup-

* "A System of Medicine." Edited by Russell Reynolds, M.D. Art. Diseases of the Spinal Cord, vol. ii., page 642. London: 1868.

porters, although Stilling, and after him Hirsch, have deserved well of science by demonstrating the untenable character of a portion of the above assertions and explanations. . . . I have, both in my private and hospital practice, subjected the question of spinal irritation to a rigid inquiry, and have arrived at the conclusion, that beyond the knowledge of some irradiated sensations and reflex phenomena, it has contributed nothing to physiology or pathology, nor is likely to do so. The patients generally being females, much deception is practised upon the medical man; and, in addition to this, the whole range of hysterical and neuralgic affections has been made available to obtain the materials for interpreting, or rather misinterpreting, the affection. . . . If we subtract the spinal pain which accompanies the diseases of various organs, for instance, the stomach or the liver, and is increased by internal [query *ex*ternal] pressure, and often associated with pain at the epigastrium, the doctrine of spinal irritation is deprived of its entire foundation, and takes its place among those fictions which have always found their way into pathology when physiology was undergoing a revolution, and have for a time been admitted as matters of fact."*

Notwithstanding the great and well-earned authority of this distinguished physician, I do not hesitate to characterise the remarks just quoted as not only rash and unjustifiable, but also as indicative of a feeling deserving only of reprobation. I presume that the "certain English Physicians" to whom he sneeringly refers as having "failed to achieve a reputation in their native country" were Mr. Player, Dr. Thomas Brown, Dr. Darwall, Mr. Teale, and the brothers Griffin. If Romberg does not advert to those men, whose writings were published before the second edition of his own work, from which the above passages are extracted, then his remarks have no force; and if he does, then I venture to assert, that their method of investigation was, in every respect, at least as critical, rigorous, and scientific as his own. If they failed to achieve a reputation in their native country, it was because their views were in advance of their time, and, as it seems, incapable of appreciation by their critic. The malady which they first studied, analysed, and described, has received increasingly special attention by neuro-pathologists, and has become thoroughly recognised as having the characters which they assigned to it. I may add that in the "System of Medicine," edited by Dr. Russell Reynolds, fourteen pages are devoted to its description and discussion, no doubt or surmise as to the reality of its existence being expressed. If Romberg was unable to find it either among his private patients or in the course of his hospital practice, I can only imagine that, either he was unable to see what

* "The Nervous Diseases of Man." Pp. 152, 154, 156. London: 1843.

was actually before his eyes, or that German women, as well as men, are, fortunately for themselves, free from a disorder from which, unhappily, many Englishmen and many more English women often suffer. So careful, elaborate, and exhaustive were the observations and records of them by the brothers Griffin that even now—nearly thirty years after they were published—no labours at all comparable to them in the same field are known to have been undertaken, and this chapter would be like the play of "Hamlet" with the character of Hamlet himself left out were I not to include in it the following admirable summary, in their own words, of their very valuable contribution to our knowledge of the pathology of the spinal cord :—

	CASES OBSERVED.	PROMINENT SYMPTOMS.
A	28 Cases of Cervical Tenderness : 8 men, 8 married women, 12 unmarried.	Headache, nausea or vomiting, face-ache, fits of insensibility, cough, affections of the upper extremities. In 2 cases only pain of stomach ; in 5, nausea or vomiting.
B	46 Cases of Cervical and Dorsal Tenderness : 7 men, 15 married women, 24 unmarried.	In addition to the foregoing symptoms, pain of stomach and sides, pyrosis, palpitation, oppression. In 34 cases, pain of stomach. In 10, nausea or vomiting.
C	23 Cases of Dorsal Tenderness : 4 men, 6 married women, 13 unmarried.	Pain in stomach and side, cough, oppression, fits of syncope, hiccough, eructations. In 1 case only, nausea or vomiting. In almost all, pain of stomach.
D	15 Cases of Dorsal and Lumbar : 1 man, 11 married women, 3 unmarried.	Pains in the abdomen, loins, hips, lower extremities, dysury, ischury, in addition to the symptoms attendant on tenderness of the dorsal. In 1 case only, nausea.
E	13 Cases of Lumbar Tenderness.	Pains in the lower part of the abdomen, dysury, ischury, pains in the testes or lower extremities, or disposition to paralysis. In one case only, spasms of stomach and retching.
F	23 Cases, all the Spine : 4 men, 4 married women, 15 unmarried.	Combines the symptoms of all the foregoing cases.
G	5 Cases, no tenderness of Spine.	Cases resembling the foregoing.

Facts and Inferences.

"It appears from this summary, and from various cases related in the preceding observations [recorded in the work of the brothers Griffin],—

"1st.—That tenderness at one or more points of the spine is an attendant on almost all hysterical complaints; on numerous cases of functional disorder, where the hysteric disposition is not so obvious; and in many nervous or neuralgic affections.

"2nd.—That many of the symptoms of these affections evidently depend on a peculiar state of certain nerves, probably at their origin, may be reproduced at any moment by pressure, and are often relieved by remedies applied there.

"3rd.—That in all the cases of tenderness of the cervical and upper dorsal spine, there was nausea, or vomiting, or pain of stomach, or affections of the upper extremities; but no pain of the abdomen, dysury, ischury, hysteralgia, or affections of the lower extremities.

"4th.—That in all cases of dorsal tenderness, pains affecting the abdomen, bladder, uterus, testes, or lower extremities, were usual symptoms: while nausea, vomiting, or affections of the upper extremities, were never complained of.

"5th.—That nausea and vomiting appeared to bear more relation to tenderness of the cervical spine, pain of stomach to tenderness of the dorsal; but that where there was soreness of both, nausea or vomiting was still more frequent, and pain of stomach scarcely ever absent.

"6th.—That where several points, or a great extent of the spinal column, is painful or tender on pressure, local remedies are generally less effectual, and there is a strong disposition to transference of the disordered action from one organ to another; the pain or tenderness, in all such cases of transference, shifting its place to a corresponding part of the spinal column, leaving the original point free, or with a very diminished degree of tenderness.

"7th.—That spinal tenderness is seldom or never met with in cases of pure inflammation, except when these accidentally occur in persons previously suffering with irritation of the cord; and that when appearances of inflammation present themselves in any organ, accompanied by a corresponding spinal tenderness, they cannot commonly be removed by the remedies applicable to inflammatory cases, and are often rendered worse by them.

"8th.—That there does not appear to be a complaint to which the human frame is liable, whether inflammatory or otherwise, which may not be occasionally imitated in disturbed states of

the cord; and hence that this disturbed state is one vast source of those complaints called hysterical or nervous.

"9th.—That those functional disorders connected with spinal tenderness are very often attended by some disturbance of the functions of the uterus; but that they are by no means always so, since they occur in those who are regular in this respect, in girls long before the menstrual period of life, in women after it has passed, and, lastly, in men of nervous susceptible habits, and in boys.

"10th.—That, in fact, they are not necessarily dependent upon the disorder of any one organ; since they are found indifferently co-existing with disturbance of the digestive organs solely, the uterus solely, or of the circulating or respiratory system.

"11th.—That from the cases detailed, we have reason to suppose spinal tenderness may arise from uterine disorder, from dyspepsia, from worms in the alimentary passages, from affections of liver, from mental emotions, from the poison of typhus, from marsh miasmata, from erysipelatous, rheumatic, and eruptive fevers, and from the irritation arising from local injury.

"12th.—That it is almost invariably found in connection with gastric or abdominal tenderness in fever; and this tenderness is probably like the soreness of scalp, pains in the limbs, &c., dependent on the morbid state of the cord.

"13th.—That whether in fevers or in other complaints, it is met with in the situation of the eighth or ninth dorsal vertebra much more frequently than at any other part of the spine.

"14th.—That affections attended by spinal tenderness are seldom fatal: that even in those instances of intense irritation of the cord, under which patients suffer extremity of pain for years, the event is generally favourable.

"15th.—That they frequently, as well as hysteria, occur with all the appearances of a primary affection of the nervous system.

"16th.—That affections are occasionally met with, presenting all the marks of the hysteric character, and perfectly resembling cases described as those of spinal irritation, but unattended by spinal tenderness, or any other direct indication of a morbid state of the cord."

The pathology of painful excitability of the spinal cord is distinctly implied in all that I have said concerning the proximate cause of the several kinds of neuralgia. The essential nature of the malady, when *most* fully developed, consists in hyperæmia of every element of the cord, and of a like condition, more or less intense, of the sympathetic ganglia—hyperæmia so considerable as to approach, in the cord at least, the border land of inflammation; for every part of that structure is functioning, or is

preternaturally liable to function, with morbidly excessive and intense activity. How nearly in these cases the state of the spinal cord approaches that of inflammation, according to the opinion expressed more than forty years ago by Mr. Teale is indicated in the following passage :—"In the absence of direct evidence from dissection, the precise nature of these affections of the spinal marrow and ganglia must, to a certain degree, remain conjectural. The collateral evidence, however, is of such a nature as to leave but little doubt of the disease being inflammatory. . . . I wish to be understood as using the word irritation in the same sense as many Continental writers have lately employed it, regarding irritation and inflammation as morbid states, differing from each other merely in degree, and exhibiting no distinct line of demarcation. The supposition that these diseases are inflammatory is greatly strengthened by a comparison of the symptoms which they present, with those attendant upon the more severe forms of inflammation of the spinal marrow, which have proceeded to a fatal termination, and have left unequivocal traces of their existence. The symptoms of the former, on careful examination, will appear simply a slighter shade of the more severe affection."* Dr. Copland's opinion is exactly to the same effect. He says,—"The diagnosis of spinal irritation appearing independently of inflammation or structural lesion, is by no means so easy as several recent writers appear to believe. Whether the painful affections of the spine are the chief disorder, or are attended by various symptomatic disorders of a more prominent character even than their parent affection, they often so nearly approach the milder grades of inflammatory action in some one or more of the tissues of the spine, that a precise line of demarcation can hardly be drawn between them. An affection which may be, with some justice, viewed as functional to day—as spinal irritation merely—may be inflammatory on the morrow, and be rapidly followed by the consequences of inflammation. Or a case may occasion apprehensions of inflammation, and yet, as respects its progress and treatment, prove functional merely; whilst another, furnishing less serious grounds of apprehension, may have been actually inflammatory, and soon furnish evidence of inflammation."* The doctrine that the phenomena in question originate in spinal hyperæmia is recognised as true by a large number of authoritative physicians, and though in this country a precisely opposite doctrine is now warmly espoused and ably advocated by Dr. Bland

* "A Treatise of Neuralgic Diseases, Dependent upon Irritation of the Spinal Marrow and Ganglia of the Sympathetic Nerve." Page 65. London : 1829.

↓ note p. 137.

Radcliffe, Dr. Handfield Jones, and Dr. Anstie, the facts they adduce in support of their views, whilst seeming, at first sight, to afford a justification of them, are, I dare to affirm, when truly interpreted, completely subversive of them, and strikingly accordant with the doctrine insisted on throughout this treatise. In a subsequent chapter I shall endeavour to demonstrate the truth of this remark. Meanwhile, I may remind the reader that among the many and various symptoms of painful excitability of the spinal cord enumerated above, there are very few not already adverted to as associated with some one or more of the several kinds of neuralgia, and shown to be dependent on the existence of some degree of hyperæmia of the spinal cord as its proximate cause. Concerning the few symptoms which I have not already specially dwelt upon, I will add a few words.

Walking or standing for any considerable length of time can scarcely fail to produce an increase of pain in the back, so great as quickly to become intolerable in cases of hyperæmia of the spinal cord, already so considerable as to approach the confines of inflammation. Difficulty of breathing, and spasmodic cough—in short, asthmatic tendencies—are distinctly expressive of spasm of the bronchial tubes, conjoined or not, as it may be, with spasm of the pulmonary blood-vessels; and in each of these cases the spasm is a manifestation of excessive energy in the nerve-centres governing the tubes in question. What proportionate amount of energy is derived from the spinal cord, and what from the ganglia of the sympathetic, it may be difficult, if not impossible, to determine; but this difficulty does not in the least impair the force of the general proposition here insisted on, for the more we ascertain of the functional as well as of the structural relations of the cord and of the ganglia, the more distinctly we perceive that where any special vascular condition—ranging between the extremes of anæmia and inflammation—obtains in any part of the spinal cord, the sympathetic ganglia nearest to that part will assume a like condition; and, conversely, any change in the circulation of the ganglia is, there are good reasons for believing, quickly propagated to the part of the cord to which they are nearest.

The headaches, sleeplessness, frequent dreaming, nightmare, great variability of mental states, habitual chilliness, coldness of the feet, shiverings and flushings, and local alternations of temperature, are all significant of morbid states of the sympathetic nerve-centres—states in which excessive energy and hyperæmia are the dominant features; for though the cerebral symptoms denote a morbidly excessive circulation within the head, and, therefore, inability of those sympathetic ganglia supplying vaso-

* "Dictionary of Practical Medicine." Vol. iii., p. 864.

motor nerve-force to the brain-arteries to counter-balance the force with which the brain-cells are attracting to themselves an excess of blood through those arteries, the peripheral circulation of all the rest, or of nearly all the rest, of the body is markedly deficient, as the general and prevailing coldness of the surface distinctly denotes; but precisely because these sympathetic nerve-centres habitually act with excessive energy, periods arrive and recur when they become temporarily exhausted, and during those periods they relax their contracting power over the arteries they respectively control, and then those arteries becoming capable for a while of unduly great dilatation, allow the structures amid which they ramify to draw through them a superabundant supply of blood, and thus to produce that flushing and feverishness, and those local augmentations of temperature characteristic of the disorder in question. In fact, the longer the disorder exists, and the more extensive its range over the several segments of the spinal cord, and its collateral sympathetic ganglia, the greater will become the instability and variability of circulation in those ganglia, and, therefore, of the general peripheral circulation which they control. Another cause of that instability of circulation, as well as of the extraordinary variability and mutability of symptoms which especially distinguish the disease must also be noted: a considerable proportion, sometimes the greater part, and sometimes the whole of the spinal cord is affected with painful excitability, and inasmuch as the different segments of the cord with their collateral ganglia of the sympathetic are functionally connected with different parts and organs of the body, it is demonstrable that if those different segments become successively the recipients of exciting impressions, the consequent sensations will be referred, and the consequent reflex phenomena, whether muscular, circulatory, or secretional, will be observable successively in those peripheral parts of the body directly corresponding to the nervous centres excited, and not only in them but also in those indirectly corresponding with those centres through nervous arcs which, though imperfect, are still capable of being the media of transmission of nervous force, which itself becomes manifest as morbid phenomena, wonderfully remote both locally and physiologically, from the nervous centre primarily excited. Now the external influences to which the patient is exposed, and the psychical influences which are constantly operative and transmitted from the brain to the spinal cord and sympathetic, vary in character and intensity from month to month, week to week, day to day, and hour to hour. The consequence is—different segments of the cord, and even the different cell-constituents of those different segments, as well as the different ganglia of the sympathetic, are affected, more or less, alter-

nately, and are affected differently at different times; and inasmuch as the nature of the impressions received, and the character of the centric-cells receiving them, conjointly determine both the nature and direction of the vital changes such impressions induce, those changes inevitably take place now in one part of the body, now in another, and reveal themselves sometimes as pain, sometimes as disorderly muscular movements, sometimes as excessive glandular action, sometimes as phenomena of local inflammation, and sometimes, indeed, very often, as morbid affections of the viscera—the brain, the digestive organs, and the womb, being most especially liable to become seats of disorder induced in the manner now explained.

The general pathology of neuralgia expounded in Chapters III. and IV. of this Volume, I have now fully exemplified and illustrated by applying it as a means of explanation of every symptom of the malady, and of every morbid phenomenon connected with any of its numerous and various forms. Tested in these different ways, that pathology seems to me, in every particular, to fulfil the essential requisitions of a sound hypothesis: it presupposes the existence of, assigns reasons for, and completely explains all the symptoms in question with that ease and simplicity which are *prima facie* evidences of its truth. In strict accordance with the requirements of the hypothesis which I have put forward, without any straining of it, without any subordinate hypotheses to supplement its defects, and without any straining of the facts themselves, each of them takes its appropriate place in an array, the orderly grouping and physiological relations of which denote unmistakably its truly natural or organic origin, as well as, within the sphere of disease, that unity in diversity—that manifold manifestation of one and the same force operative in different structures, and, therefore, apparently in different ways—characteristic of all complex vital organisms. Moreover, the principle and method of treatment directly indicated by that hypothesis as most likely to be successful have been found, by experience, to be so in a pre-eminent degree: this satisfactory result, while of paramount importance in a practical point of view, constitutes, as it seems to me, a conclusive proof, if considered in connexion with all the other evidence, of the truth of the doctrine in question.

CHAPTER VIII.

DR. C. B. RADCLIFFE'S THEORY OF THE GENESIS OF PAIN.

SEVERAL theories which have been propounded concerning the nature of the proximate cause of neuralgia have already been reviewed in Chapter II.; but the one which recently has attracted the most attention, and has exerted the most influence on therapeutics, viz., the one especially associated with the names of Dr. Radcliffe and Dr. Anstie, I merely mentioned—without adding any criticism of it, and contented myself with stating that, as I should develop a doctrine exactly the reverse of it, and should give my reasons for that doctrine, those of my readers who should consider those reasons valid would see in them an implicit confutation of the theory in question. But on reconsidering the appeal made by Dr. Radcliffe, especially in his article* on "Diseases of the Spinal Cord," to certain *pathological* facts which he looks upon as confirmatory of that theory, and as only explicable by it, it seems to me desirable that I should state what those facts are, and what is their real as well as apparent significance in respect to the opposite doctrines concerning the proximate cause of pain held respectively by him and myself.

In his Lectures, delivered before the Royal College of Physicians,† Dr. Radcliffe developed an elaborate theory concerning muscular motion and sensation: in respect to sensation, his cardinal doctrine is, I believe, correctly stated as follows:—During each act of normal feeling there is an electric change in the feeling nerve, and in the sensory centre to which it is related; this change consists in a temporary reversal of the ordinary electric state of the nerve and nerve-centre in question; this reversal is accompanied by a discharge, or loss, of "natural electricity"; while this reversal obtains, the vitality of the nerve and nerve-centre is lower than it is when the nerve and nerve-centre are not functioning; and hence, a diminution of the normal supply of arterial blood, or the circulation of venous blood in the nervous centres, or, in other words, a lowering of their vitality

* Published in the "System of Medicine," Edited by J. R. Reynolds, M.D. Vol. II. 1868.

† "Lectures on Epilepsy, Pain, Paralysis, and certain other Disorders of the Nervous System," delivered at the Royal College of Physicians in London. By Charles Bland Radcliffe, M.D. London: 1864.

increases their sensibility or irritability, and therefore constitutes the indispensable condition precedent of pain.

Having propounded this astonishing theory, and having, as he believes, proved its truth, Dr. Radcliffe repeats the expression of it in several successive propositions, involving statements of pathological facts, which are called as witnesses to prove it. I refrain from discussing the significance of the electro-physiological experiments which he either exhibited in the course of his lectures, or has since adduced, in support of it, for such a discussion would occupy much more space and time than I can give to it, or, indeed than, so far as I am able to judge, the intrinsic worth of the hypothesis justly merits. Moreover, the radical elements of his theory seem to be still undergoing transmutation: in his newly published volume,* which, though not avowedly a second edition of his previous work, comprises the substance of it, and is intended to supersede it, he records the discovery of new facts, his recognition of which has necessitated a partial reconstruction, at least, of the foundation of his doctrine. He says,—"What to think of this state of things I could not at all see at first. The facts would not chime in with preconceived conceptions, and the end was that the conceptions had to be modified to suit the facts;"† and believing, as I do, that the "conceptions" will have to undergo several more metamorphoses before they suit all the facts which a true theory of the genesis of muscular motion and of pain must fully explain, I do not think it, at present, expedient to attempt a critical analysis of those "conceptions;" but concerning the pathological facts to which he refers, his interpretation of them, and the use he makes of them, I think it desirable that I should offer a few remarks; for if it can be shown that those facts are, to any extent, really accordant with, and explicable by, that hypothesis, which is diametrically opposed to the one to which I adhere, then to that extent, at least, the latter is implicitly condemned; but if, on the other hand, I prove that Dr. Radcliffe's interpretation of those facts is not the true one; that he is not scientifically justified in using them as he has done; that rightly understood they afford no support whatever to his doctrine; and that they are alone truly explicable by the one I have expounded, I shall, I hope, remove what may seem to some pathologists the chief obstacles to its acceptance.

Dr. Bland Radcliffe says,—"*Pain of a neuralgic character may be associated with a very depressed condition of the circulation.* It is a well-established fact that neuralgia in its most

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* "Dynamics of Nerve and Muscle." By Charles Bland Radcliffe, M.D., F.R.C.P. London: 1871.

† *Ibid.* Preface, p. 7.

excruciating form may occur again and again without fever or inflammation. . . . Judging from the pale and perspiring skin, and the miserable pulse, which are so generally met with in the actual paroxysm of neuralgia, it may be supposed that this paroxysm is associated with a state of the circulation in which the habitual depression [alleged to exist] is exaggerated. Indeed, the appearances during such a paroxysm are often calculated to remind one of the cold stage of ague."* The whole paragraph from which this passage is extracted contains no word distinguishing the simultaneous state of the circulation in the spinal cord and sympathetic ganglia from that here alleged to be generally observable during the neuralgic paroxysm, and the meaning which the author evidently means to convey is, that this "depressed state of the circulation—a state of anæmia, and not a state of hyperæmia," obtains in those nervous centres as well as throughout the periphery of the body generally. Now, whether or not that state does also obtain simultaneously in those centres is the very pith and marrow of the question at issue; and his assertion that it does is not only not proved, but, in my opinion, is actually disproved by thoroughly established facts. Even Dr. Radcliffe probably recognises the fact that the anæmia of the surface of the body, observable in the cold stage of ague, is due to excessive action of the ganglionic nervous centres, for he himself testifies to the truth of the discovery, made by Claude Bernard and Brown Séquard, that the contraction of the arteries in any, or in all parts of the body, is effected by "a state of action" of the ganglionic nervous centres functionally related by vaso-motor nerves to those arteries; he maintains, however, that the more intense this "state of action" is, the less is the supply of blood, or, at least, of arterial blood in those centres! But though he believes in this continuous miracle—the production of nervous energy in inverse ratio to the quantity of arterial blood supplied to the nervous centres producing that energy—the great majority of neuro-physiologists and pathologists assuredly look upon vigorous action of the vaso-motor nerve-centres as evidence of an abundance of arterial blood in those centres, and therefore, while altogether refusing to admit that "a very depressed condition of the circulation" in the periphery of the body justifies the inference that a like condition obtains in the vaso-motor nervous centres, they will, I doubt not, interpret the state of peripheral anæmia as an expression and immediate product of hyperæmia in those centres. This conclusion is con-

* *Ibid.*, pp. 270, 271. This passage is word for word the same in the "Lectures," published in 1864, and in the "Dynamics of Nerve and Muscle," from which it is now quoted.

firmed by numerous *post-mortem* observations in cases in which sufferers from cholera have died during the cold stage or in "collapse," and when, therefore, the peripheral arteries are contracted to the uttermost: in such cases the ganglionic nervous centres have again and again been found excessively hyperæmic. I may add that when ice is properly applied along any part of the spine, the peripheral arteries of the corresponding segment of the body become relaxed, and that when heat is thus applied the peripheral arteries become contracted. The relaxation is denoted by increased heat, and often by perceptibly increased fulness of the peripheral parts in question, while the contraction is denoted by a fall of temperature, and sometimes by more or less obvious shrinking of those parts. Now, I believe there is no possible explanation of these positive facts, except that which pre-supposes them due to modifications of the state of the circulation of blood in those centres—modifications induced, in the one case, by the application of cold, and, in the other, of heat to the spine; and that whereas the effect of the cold consists in lessening the vitality, contracting the blood-vessels, and lessening the amount of blood, the effect of the heat consists in augmenting the vitality, dilating the blood-vessels, and increasing the amount of blood—or, to use other words, in greatly exalting and quickening the circulation—in those centres. This conclusion directly contradicts, in so far as the ganglionic nervous centres are concerned, the proposition of Dr. Radcliffe at the head of this paragraph, and, implicitly, the general theory of which that proposition forms a part; but it, as well as that part of his proposition which relates to the peripheral circulation only, is in perfect harmony with the pathology of pain explained in this volume. The question whether the spinal cord is anæmic or hyperæmic in cases of neuralgic pain I have already fully discussed; but I may observe here that the sympathetic ganglia and the cord are intimately connected, structurally as well as functionally—that, in fact, the several parts of the former are said to originate in the latter, and that, as there is a recognised tendency in all parts of the body to assume a condition of circulation or vascularity like to that of immediately neighbouring parts, the inference that when any considerable group of sympathetic ganglia is hyperæmic the proximate segments of the spinal cord are in a like condition, is a valid one.

"*Pain of a neuralgic character,*" says Dr. Bland Radcliffe, "*would seem to be antagonised rather than favoured by an overactive condition of the circulation;*" and he tries to establish this proposition by adducing in support of it several pathological facts generally recognised as indubitable, and akin to each other in character. He says,—"In rheumatic fever, the rule I believe,

will be found to be this—that the pains which had been torturing the patient for days or weeks or months previously . . . come to an end when the feverish reaction and local inflammation of the fully-formed disorder, make their appearance." He adds,—"It is also difficult to look upon the local inflammation of gout as essential to the existence of the racking pain of this disorder;" he quotes Sydenham's description of an attack of gout, to prove that the pain precedes the inflammation, and appeals to Dr. Garrod in confirmation of his assertion that when gouty "inflammation runs higher than usual, *the characteristic pain is less urgent than usual.* . . . It would seem," he says, "as if the inflammation of gout were not essential to the pain of gout. It would seem as if the pain went hand in hand with the rigors which are preliminary to the development of the inflammation. . . . Nay, it would even seem as if the pain were put an end to by the establishment of the inflammation—as if, in fact, the pain were antagonised rather than favoured by the inflammatory condition. . . . There is also reason to believe that pain holds the same relation to fever and inflammation in other kinds of fever besides the rheumatic, and in other kinds of inflammation besides the gouty. Six or seven years ago, I had a patient in the Westminster Hospital who, when I saw him first, complained of violent pains all over the body, especially in the back and loins, and also of chills and shivers. A few hours afterwards he was hot and feverish, and the pain and chills and shivers had all taken their departure. The case was one of small-pox; and the lesson I gathered from it was that the pains and the rigors were symptoms which ought to be classed together, and considered as belonging to the cold and not to the hot stage of the fever. And this case would seem to be a fair illustration of what happens in other fevers; for it seems to be the rule rather than the exception for the pains which attend upon the onset of these disorders to pass away or to become greatly mitigated when the cold stage gives place to the hot stage. . . . Nor is it different with inflammation. In the case of a dislocation or sprain, for example, the acute pain of the accident does not, as a rule, remain after the parts have begun to be hot and swollen and tender; and this case is certainly no exception in the history of inflammation. It would seem, in fact, as if the proper place for the pain was among the phenomena of the preliminary stage—the stage of 'shock,' and not among the phenomena of actual inflammation. . . Nor is a contrary conclusion to be drawn from the history of certain cases in which pain continues as a permanent symptom after the full establishment of inflammation, as, for example, in deep-seated inflammation of the mamma; for, in these cases, it is a fact that this per-

sistent pain is immediately relieved or removed by those operative measures which diminish the tension or stretching arising directly or indirectly from the inflammation.*

Though Dr. Radcliffe asserts that "pain of a neuralgic character seems to be antagonised rather than favoured by an over active condition of the circulation," he does not say whether he means "an over active condition of the circulation" in the nervous centres as well as in the periphery of the body; but the general drift of his argument, and especially the whole tenor of his remarks in his article on "Diseases of the Spinal Cord," make it certain that this is precisely what he does mean. In fact, the proposition, established as he believes himself to have established it, is intended as a conclusive confirmation of his fundamental principle that pain and vitality of the sensory nerve-centres are in inverse proportion to each other. Stated briefly, the argument by which Dr. Radcliffe endeavours to support the proposition in question consists in his assertion that, as a general rule, the pain which is felt in cases of fever does not accompany the fever, but precedes it; that in like manner, the pain which is felt in cases of inflammation does not accompany the inflammation, but precedes it; and that, moreover, the supervention of the actual fever or inflammation drives away, or antagonises, or, at least, mitigates the pain. The relation in respect to time, or the order of succession of the pain and fever, or of the pain and inflammation, is an exceedingly interesting and instructive one; but its pathological significance seems to me wholly misinterpreted by Dr. Radcliffe, and the following considerations will, I believe, show that, while rightly interpreted it affords no countenance whatever to his peculiar theory, it confirms in a striking manner the doctrine concerning the proximate cause of pain explained and exemplified in the preceding chapters of this work.

It will probably be thought that the exigencies of his theory have tempted Dr. Radcliffe to draw a more distinct line of demarcation between the pain and fever and between the pain and inflammation than is warranted by the accurate observation of the phenomena in question—that, in fact, pain co-exists with the fever and with the inflammation more generally, or to a greater extent, than his statement of the case implies; but, whatever may be the exact truth of the matter, I think it expedient, for the sake of the argument, to assume the correctness of that statement, and it seems to me that the facts which it embodies are fully explained by the following propositions:—(1) That all fevers and inflammations begin in the nervous system, and are essentially disorders of that system; (2) That as

* "Dynamics of Nerve Muscle." By Charles Bland Radcliffe, M.D. F.R.C.P. London: 1871, p. 271, *et seq.*

their exciting cause or causes must first operate on centrepetal nerves, the sensory nerve-centres into which they converge are primarily irritated, and therefore give evidence of the morbid excitement which is being wrought in them in the swiftest and most immediate way they can, viz., by functioning so intensely as to produce the consciousness of pain before the other phenomena of the fever or inflammation, which is being developed, are observable; (3) That the excitement of those centrepetal nerves which are within the area of operation of the exciting cause of the fever or inflammation, and which terminate in vaso-motor nerve-centres, originates irritation, hyperæmia, and consequently excessive reflex action of those centres on the blood-vessels to which they are functionally related, and thus produces that peripheral anæmia and surface-pallor constituting, when obtaining all over the body, the most obvious phenomena of "nervous shock;" (4) That the primary irritation of the sensory nerve-cells in some part of what Marshall Hall called "the true spinal cord" (viz., the conjoint spinal cord and medulla oblongata) in cases of local inflammation, and in the whole of that nervous centre in cases of fever, is slowly propagated to those cells in which originates the force productive of textural nutrition, and which, becoming preternaturally excited, transmit their morbidly excessive force through positive-motor nerves, or "nutritive and secretory conductors," and thus, according to the nature of the primarily exciting cause, light up local inflammation in the one case, or general fever in the other; (5) That, as through the medium of the centrepetal nerves, the sensory cells in the spinal cord and the vaso-motor cells in the sympathetic ganglia first receive the impulse of the exciting cause, the morbific force which is expended on them becomes, as a general rule, first exhausted; (6) That as the centrepetal nerve-cells become thus exhausted, pain gradually subsides, and the peripheral blood-vessels held firmly, contracted until now by the constringing action of the preternaturally energetic vaso-motor nerves, are allowed completely to relax, and thus to convey a superabundance of fuel to the fire originated by the conductors of the nervous force effecting textural nutrition—whether that fire is restricted to some one region of the body (local inflammation) or extends over the whole (general fever)—while the positive motor (nutritive) nerve-centres still continue in excessively vigorous action; and lastly (7), That in those cases in which the pain persists, as "in deep-seated inflammation of the mamma," the morbific force expended on the sensory nerve-cells, instead of becoming exhausted, is constantly renewed by continuous irritation of the sensory nerves, rendered preternaturally sensitive by being within the focus of inflammation, and subjected to pressure or stretching owing to the peculiar character of the structures amid which they ramify.

If, as is generally admitted, pain in the back, chills, and shivers herald the onset of small-pox and other fevers, if pain in some cases of local inflammation is the first and principal symptom, if pain can only be experienced by the agency of nerve-cells in some part of the "true spinal cord," and if chills and shivers are mainly induced by vaso-motor nerve energy, causing general constriction of the peripheral arteries, the propositions that all fevers and inflammations begin in the nervous system and are essentially disorders of that system seems to me incontrovertible; and, therefore, I adopt it as the fundamental principle by which to explain the pathological phenomena in question. I feel confident, however, that Dr. Radcliffe agrees with me in recognising the truth of this principle; we only differ as to the *state* of the nervous system *while* those phenomena are observable.

In respect to my second proposition it must be observed that, even in those cases in which a cause of fever may be fairly supposed to gain access to the system by first coming in immediate contact with the blood, it is certain that when the sensory nerves throughout the body are bathed with blood which has received a morbid taint, they will become so affected as to produce a profound impression on the sensory centres into which they converge; and, therefore, that in these cases, as well as in those in which the exciting cause undoubtedly operates primarily at the periphery of the centrepetal nerves, we are justified in inferring that that part of the nervous system, the special function of which is the reception of impressions, will be the first to be modified by the agency of the morbific cause in question. Now, if my second proposition be admitted, the fact that pain and "nervous shock" are the forerunners rather than the accompaniments of fever and local inflammation, is at once and easily intelligible, without resorting to the far-fetched hypothesis that "pain of a neuralgic character would seem to be antagonised by an over active condition of the circulation." Moreover, I repeat my assertion that pain, and especially pain in the back, is annulled by the sedative influence of ice along the spine; but if pain in the back were "antagonised by an over active condition of the circulation" in the spinal cord, surely the application of ice which induces an exactly opposite condition ought, instead of abolishing, to favour the development of pain.

Again, according to proposition 3, the most obvious phenomena of nervous shock—peripheral anæmia, and consequent surface pallor, while not necessarily denoting a depressed condition of the circulation in the nervous centres, may actually denote and, indeed, originate in an exactly opposite condition. That they do originate in hyperæmia and not in anæmia of the

vaso-motor nerve-centres, is demonstrated by Claude Bernard and Brown Séquard, and is admitted by almost every neuro-pathologist entitled to form an opinion on the subject, and the demonstration is conclusively confirmed, as it seems to me, by the established fact that those phenomena, like pain, may be abolished by the application of ice along the spine.

In reference to proposition 4, I may remark that, as the nutritive nerve cells are concerned in maintaining that steady equilibrium between the constructive and destructive processes of textural nutrition, which is the essential condition of the continuous life of the organism, it is readily conceivable, and, indeed, to be expected that they should be less easily and less speedily influenced than are any other constituents of the nervous system by causes operating from without: a splinter in the finger produces pain immediately after its insertion, but a considerable time elapses before the excitement of the sensory nerve-cells, resulting in pain induced by the irritating action of the splinter, is extended to the neighbouring nerve-cells, which are sources of nutritive force, and becomes manifest in that intensified action of textural nutrition, we call inflammation, in the part where the splinter is inserted. In like manner the poisons productive of various diseases—and especially of those constituting the exanthematous group—though producing an immediately perceptible effect on the sensory and vaso-motor nervous system, do not reveal their virulence through the agency of the positive motor, or nutritive and secretory nerves, until several days have elapsed; and it seems to me not improbable that some definite relation will yet be discovered between the length of the period of incubation of each eruptive disease and the force of the poison generative of it, and, perhaps, it will be found that the greater the force the more quickly it effects those morbid changes in the nutritive processes which manifest themselves in eruption. Moreover, the time which necessarily elapses after the reception of the poison and the full manifestation of its influence by the textural changes which it produces, is prolonged by the temporarily contracting power of the vaso-motor nerve-centres; for, according to proposition 3, the effect of the poison in those centres is preternaturally vigorous action, and, consequently, such energetic contraction of the peripheral arteries as to produce peripheral anæmia. Now, so long as this condition lasts, the nutritive nerves may function with morbidly intense energy, and yet the evidence of their action may be comparatively slight. But a time soon comes when, according to propositions 5 and 6, the energy of the sensory and vaso-motor centres is spent: forming as they do the outworks of the associated structures of nervous centres, they are at-

tacked first and yield first. Claude Bernard has demonstrated that when the spinal nerves are severed from the spinal cord they begin to die at the periphery, and that death slowly and gradually advances from the periphery to the centres. Now, the vaso-motor nerve-centres themselves occupy in relation to the spinal cord a peripheral position, and therefore, if arguing from analogy only, I should infer that, in cases of death of the whole nervous system, those centres die before the spinal cord, and, by a parity of reasoning, I infer that in cases of inflammation and fever their energy is first exhausted. But, confirmatory as this argument is of the propositions in question, it is scarcely needful, seeing that the speedy supervention of what is called the stage of feverish reaction, after a period of chilliness and shivering, is not only inevitable for the reason already explained, but is a fact of common observation. Now when, in the cases under discussion, the energy of the vaso-motor centres becomes exhausted, the peripheral arteries relaxing, allow a superabundant supply of blood to pass through them and become the material wherewith the morbidly excited nutritive nerves affect those formative and transformative processes, constituting the most notable phenomena of exanthematous fevers.

If the foregoing interpretation of the facts in question is the correct one—and I am constrained to believe it is—then it is obvious that pain is "antagonised" in no way whatever by "an over active condition of the circulation": the relation of the phenomena is one of orderly sequence, arising out of the necessary conditions under which the force producing them operates, and is, in no sense, a consequence of their simultaneous incompatibility. In fact, for the reason stated in proposition 7, pain and inflammation do very often co-exist, and though, as Dr. Radcliffe says, pain is in such cases immediately "relieved or removed by those operative measures which diminish the tension or stretching arising directly or indirectly from the inflammation," the mode of relief does not consist in removing the inflammation, but only the pressure or tension on the sensory nerves, which was protracting their excitement, and, therefore, acting as a continuous cause of the continuous pain.

Having adduced the pathological facts just discussed in support of his position, that pain is antagonised by an over active condition of the circulation, Dr. Bland Radcliffe then goes a step further, and declares that "*there is reason to believe that pain of a neuralgic character is antagonised rather than favoured by inflammatory excitement of the nervous system.*" In order to prove this remarkable proposition, he appeals to facts of a nature very similar to those already discussed: he says that, when he himself was suffering from neuralgia, the pain subsided when "local

tenderness, redness, and swelling, with general feverish reaction" set in; that it is "the rule rather than the exception for tooth-ache to come to an end when the face becomes swollen and inflamed;" that the stabbing pains, which so generally precede the inflammatory eruption of herpes, scarcely ever remain after this eruption is fully developed; and that in three cases of sciatica which he mentions, "the plain fact was that the severe neuralgic pain, which had existed for some time previously, was at an end when the swelling and tenderness gave evidence of the establishment of inflammation in the course of the sciatic nerve." These cases are in no respect essentially different from those which I have already discussed, and which I have shown to afford no real support to the theory in favour of which they are put forward; but when an attempt is made to adduce facts in proof that pain is antagonised by inflammatory excitement of the brain and spinal cord, the facts have to suffer a tremendous strain.

Dr. Radcliffe says,—"Even in inflammation of the membranes of the brain, severe pain in the head cannot be looked upon as a symptom of this inflammation. Three or four years ago I had a youth in the Westminster Hospital, with well-marked symptoms of acute cerebral meningitis. When I first saw him, he complained of frequent rigors, and of a constant agonising pain in the head, and at this time his face was pale and perspiring; his ears and his head generally were below the natural temperature, his pupils somewhat dilated, and his pulse contracted and feeble. Eight hours afterwards, when I saw him the second time, his face was flushed, his head burning hot, his pupils contracted, his eyes ferrety, his skin hot and dry, his pulse strong and full, and fierce delirium had taken the place of pain. And this, so far as my experience goes, is the regular history of pain in this disorder." In short, while the cerebral inflammation was being developed, the pain was so intensely acute as to result in the loss of normal consciousness, which was replaced by "fierce delirium," a state when the brain, in respect both to feeling and thinking, is functioning with such tumultuous and overwhelming rapidity as to prevent either any thought or any feeling from making an abiding impression, and hence, most fortunately for the sufferer, no consciousness or memory of pain endured during the delirium is retained.

In cases of inflammation of the membranes of the spinal cord, Dr. Radcliffe admits that "pain along the spine," as well as in the extremities, "must be regarded as the most prominent symptom, but," he says, "It is brought on by any movement of the trunk, and in great measure at least, it may be prevented by avoiding such movement. It is often brought on also by moving one of the extremities, the pain in

this case beginning in the limb, and extending thence to the spine. It seems to depend, in part at least, upon the same cause as the pain of pleurisy, viz., the dragging of an inflamed and, therefore, exquisitely tender serous membrane."

The presence of pain in cases of uncomplicated inflammation of the spinal cord itself cannot, unfortunately, be referred to "the dragging of an inflamed and, therefore, exquisitely tender serous membrane;" and, as such pain is stubbornly irreconcileable with his theory, he boldly questions its existence in such cases: it is admitted that Dr. Brown Séquard describes "a constant pain in the part of the spine, corresponding to the upper limit of the inflammation of the cord," as a characteristic symptom; "but," says Dr. Radcliffe, "I question very much whether this statement is in accordance with well-sifted clinical facts. . . . At any rate, it is certain that there is not in uncomplicated myelitis that severe pain in the back and limbs which is brought on or aggravated by movement in spinal meningitis." He frankly states that "in three cases of well-marked spinal congestion, and in many cases of partial congestion," he has observed "dull aching along the spine increased by warmth," and then, unfortunately for his theory, he makes this additionally damaging admission—"I have also noticed the same symptom in myelitis and spinal meningitis . . . in fact, so far as my experience goes, I can say that this symptom is likely to be met with in congestive or inflammatory diseases of the cord." In regard to each of the spinal affections mentioned, he says—"Absence of spinal tenderness I believe to be the invariable rule;" and yet further on, when adverting to "spinal irritation," he reveals the unreliableness of this statement, and again damages his own theory by saying—"spinal tenderness would seem, indeed, to deserve to be regarded as the pathognomic symptom of spinal irritation; for *in the few cases of spinal meningitis, myelitis, or spinal congestion, in which it is met with*, there is reason to believe that its presence may be accounted for by the association of the phenomena of irritation with that of inflammation or congestion."

But, in truth, the facts observed by the great body of impartial and competent professional witnesses, completely confute Dr. Bland Radcliffe's assertions, that "even in inflammation of the membranes of the brain severe pain cannot be looked upon as a sympton of this inflammation;" that the pain of spinal meningitis may be, "in great measure at least, prevented by avoiding" movement of the trunk; and that "there is not in uncomplicated myelitis that severe pain in the back and limbs which is brought on or aggravated by movement in spinal meningitis." In Dr. Copland's definition of cerebral meningitis, the first words are—

"Acute pain in the head," and, in describing the symptoms of the disease, he says :—"*acute meningitis* of the convexity of the cerebral lobes is attended with violent pain, which is exasperated at intervals."* This description is endorsed by Aitken.† Dr. Watson says—"speaking generally, this complaint is marked by pain of the head ;" and, referring to a case by way of illustration of the disease, he remarks—"there was no symptom to mark the extensive mischief within the head, except the *pain ;*" and then, having described another case, he says—"there again pain was the most prominent symptom."‡ Dr. Wood mentions that—"*along* with the usual *febrile* phenomena which usher in acute inflammation, are conjoined intense headache, *redness of the face*, suffusion of the eyes, an excited or wild expression," &c.§ Testimony to this effect abounds, in fact, in the writings of every author who has given especial attention to the subject; and though it may be admitted that cerebral meningitis and cerebritis generally co-exist, the existence of pain in cases designated cerebritis, while confuting, so far as the meningitis, supposed to accompany it, is concerned, Dr. Radcliffe's assertion of the absence of pain in that malady, confutes at the same time his broader proposition that, as a general rule, pain is antagonised by inflammation : "in cases of cerebritis," says Dr. Flint, "a pretty constant premonition [of coma] is *persisting cephalalgia*, referred to a particular spot or limited to one side of the head, that is unilateral."‖ Even Dr. Hammond, who, to a considerable extent, is a follower of Dr. Radcliffe, dissents from his statement concerning the facts in question : of "the stage of invasion" of acute cerebritis, Dr. Hammond says,—"The most prominent initiatory symptom is headache ;" and of "the stage of excitement" he adds,—"The pain in the head augments in violence, and is increased by pressure on the scalp, or even the slightest movement."¶

Again, the evidence on all sides in respect to spinal meningitis, as well as myelitis, proves indubitably that the actual facts have a totally different aspect from that in which, tempted by his hypothesis, he has been induced to present them. Speaking of the two chief and most constant symptoms—"symptômes qu'on pourrait considérer en quelque sorte comme signes pathognomoniques de l inflammation aigué des membranes de la moelle"

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* "Medical Dictionary" I., 228.
† "Science and Practice of Medicine" II., 275.
‡ "Principles and Practice of Physic." Fourth Edition, I., 379, 380-81.
§ "Practice of Medicine," II., 609.
‖ "Practice of Medicine," p. 602.
¶ "A Treatise on Diseases of the Nervous System. By William A. Hammond, M.D. New York : 1871. Pp. 219, 220.

—Ollivier says one of them is "une douleur plus ou moins vive dans la region du dos : elle semble partir en général du point ou l'inflammation a la plus d'intensité, et là elle est aussi toujours plus aigué.* "Acute pain in the course of the spine" are the first words of Dr. Copland's definition of spinal meningitis. He adds—"the pain is severe, and although beginning in a particular part or region, generally extends more or less along the spine." And, in like manner, he observes—"acute myelitis commences with or without chills, or rigors, with acute deep-seated pain in some portion of the spine that is much aggravated by motion."† "The commonest symptoms of inflammation of the meninges of the cord," says Dr. Watson, "appear to be pains, often intense, extending along the spine, and stretching into the limbs, and aggravated usually by motion, and simulating, therefore, rheumatic pains."‡ Dr. Aitken says, meningitis "is characterised by pains in the back. . . . A greater or less degree of pain of the back, *proceeding from the point of greatest intensity of inflammation*, is one of the most prominent symptoms."§ And, again, concerning myelitis he says —"the patient complains of pain in the back *corresponding to the seat of greatest intensity of the inflammation*."‖ Concerning spinal meningitis, Dr. Hammond affirms that "there is intense pain in the back, which is aggravated by every movement of the patient;" and, referring to the symptoms of acute myelitis, he says,—"Among the first, pain in the back at the seat of the lesion is prominent. It is not, however, so intense in character as that attendant on meningitis. The limbs below the seat of the inflammation are likewise affected with pains, which are mainly confined to the trunks of the nerves coming from the affected portion of the cord. A pain is also experienced, in the great majority of cases, at the upper limit of the inflammation, and which extends rouud the body at that height."¶ In respect to each of these affections, the testimony of Dr. Flint** wholly confirms the truth of the authoritative statement just quoted, and I am sure the great body of physicians, who are not committed to any theory on the subject, will recognise them as accurate representations of the facts in question. My own experience of these maladies assures me that those statements are true, but in this case I prefer to rest my arguments on the evidence of the most widely recognised medical authorities; and, as I have now shown, they

* "Traité de la Moelle Epinière et de ses Maladies." Par C. P. Ollivier. Deuxième Edition. Tome Second, pp. 594, 597.

† "Medical Dictionary." Art., "Inflammation of the Membranes and of the Spinal Cord."

‡ "Principles and Practice of Physic," I., 481.

§ "Science and Practice of Medicine," II., 453.

‖ *Ibid.* p. II, 457. ¶ *Op. Cit.*, 456.

** "Practice of Medicine," pp 592, 634.

warrant me in asserting that as a general rule pain is not only among the chief symptoms, but is the predominant symptom of inflammation both of the cerebral and spinal membranes, and of the brain and spinal cord themselves. I say *as a general rule* because occasionally, though rarely, cases of myelitis occur in which little or no pain in the back is complained of. In these exceptional cases it is probable, I think, that either the inflammation does not extend to the sensory elements of the cord, or that they are so swiftly and so completely congested—possibly disorganised—at the very outset of the disease as at once to prevent them, at the seat of inflammation, from functioning at all: in either case, as is easily conceivable, there may be little or no pain.

Such being the facts of the case according to the authoritative observers whose evidence I have just quoted, I was somewhat surprised to find that the classical work of Ollivier is appealed to by Dr. Radcliffe in support of his doctrine. Referring to the alleged "absence of pain in the spine and extremities" in cases of myelitis, he says,—"Pain, either in the spine or elsewhere, is not mentioned for example, in the nineteen cases, acute and chronic, given by Ollivier, except in three, and of these three the myelitis was complicated with meningitis in two, and in the one remaining the symptoms justify the presumption that the same complication existed." But though this statement is literally true, it is not the whole truth. Regarded as it stands in the context of Dr. Radcliffe's article, it certainly impresses his readers with the conviction that he has the great authority of Ollivier in support of his doctrine that inflammation of the spinal cord is unaccompanied by pain at the seat of inflammation. As about fifty years have elapsed since the reports in question were written, any explanation of their silence concerning the presence or absence of pain is unverifiable now, and therefore useless; I believe, however, that a complete explanation of that silence is derivable from a due consideration of the sources and character of those reports, and that if Ollivier were still in the flesh he would be more surprised, even, than I was, on finding his cases appealed to in support of a doctrine diametrically opposed to the one he taught, the latter being concealed in silence meanwhile. In his explicit description of the symptoms of myelitis, Ollivier says,—"The patient complains of a deep and, more or less, intense pain at some point along the spine—pain which corresponds to the part of the nervous centre, which is the seat of inflammation. This pain may extend itself along the whole length of the back." He adds,—"According to Klohss,* the pain is augmented by lying on the back, especially if the patient lies on a feather bed, and not on a mattrass."†

* "Dissert. de Myelitide," page 32, cited by Ollivier.

† *Op. Cit.*, Vol. II., p. 701.

Dr. Radcliffe's assertion that, in cases of cerebral meningitis, the pain precedes but does not accompany the stage of inflammation, receives no countenance from any medical writer I am acquainted with; and though it is generally recognised that in cases of inflammation of the membranes of the spinal cord, the accompanying pain is increased by movement either of the trunk or of the limbs, none of the authorities mentioned give the faintest intimation that the pain of spinal meningitis does not exist unless when induced by movement. In maintaining this novel position, that the pain is almost wholly due to movement of the trunk or extremities, and may, therefore, be almost wholly prevented by avoiding such movement, Dr. Radcliffe stands alone.

On the subject of spinal tenderness there seems to be some confusion in Dr. Radcliffe's mind; for, anxious as he is to demonstrate that in cases of congestion of the spinal cord and of inflammation of both the cord and its membranes, absence of spinal tenderness is the "invariable rule," he announces, as a distinct proposition, that "pain, the result of tenderness, would seem to be associated with a state of inflammatory excitement in the nervous system." But if it is, why is he so ready as he is to recognise the presence of spinal tenderness in cases of so-called "spinal irritation," which, as he declares, denotes "a deeply depressed condition of circulation in the spinal cord?" and why does he seek to prove that spinal tenderness is invariably absent in cases of inflammation of the cord and its membranes? I may of course misunderstand him, but, after carefully considering all he has published on the subject, it seems to me that he makes "tenderness" play two parts differing completely from each other in character. According to his theory, "spinal irritation" is an especially characteristic feature of the neuralgic constitution which, as he says, is associated with a depressed condition of the circulation; therefore, if I understand him rightly, he adduces "tenderness" of the spine in cases of spinal irritation as evidence of that neuralgic diathesis or extreme nervous excitability which he regards "as a sign of defective vital power in general, and of defective nerve-power in particular. Having presented "tenderness" in the character just mentioned he makes the utmost possible effort, and even ignores well-authenticated facts, in order to ensure the absence of that symptom, as well as of spine-ache, whenever meningitis or myelitis are on the stage of discussion; for the introduction of tenderness of the spine as a sign both of a depressed circulation in the spinal cord and of that extremely exalted condition of the circulation constituting inflammation would be too glaringly absurd to be tolerated even by the most thoughtless reader. But when in the serene and elevated region of abstract theory, where

the concrete and obstinate facts of spinal irritation and spinal inflammation cease from troubling, Dr. Radcliffe reveals the true nature of "tenderness" in the non-refracting light of pure intellect as "associated with a state of inflammatory excitement in the nervous system," and indeed as a direct product of that state! The reader will probably exclaim, "There is no need of a prophet to tell us this!" Perhaps not. Dr. Radcliffe, however, believes himself to have discovered that the nature of the proximate cause of pain of a neuralgic character differs fundamentally and essentially from that of the proximate cause of "pain the result of tenderness;" accordingly he thinks it necessary for the sake of his theory to insist on that difference, and apparently does not perceive that the co-existence of pain even "when the result of tenderness" with "a state of inflammatory excitement in the nervous system" invalidates that theory. For what is the pathological significance of "pain the result of tenderness"? I venture to affirm that it is excessive excitation of the sensory nerve-centres consequent on excessive excitation of the peripheral ends of the sensory nerves within the area of the tender region. The tender region is tender for one or both of the following reasons:—(1) because its sensory nerve-centres are in a state of excessive excitability (due as I affirm to hyperæmia of those centres); or (2) because it is the seat of inflammation of some grade of intensity. It is tenderness of the second kind to which, as I apprehend, Dr. Radcliffe refers. Now, if the tenderness of this kind be produced by inflammation pure and simple, the existence of such tenderness seems to me to be a fact wholly at variance with the requirements of his theory: tenderness means a great susceptibility of the tender part to external impressions which are capable of exciting pain in it with preternatural facility, and while this great susceptibility is a condition which as, Dr. Radcliffe assures us, is peculiarly favoured by a depressed condition of the circulation, pain itself, he says, is associated with a reversal of the normal state of electricity in the nervous centre in which the painful nerves converge—a reversal consequent, as he also says, on a deficiency of arterial flood in that centre. In recognising that "pain, the result of tenderness, would seem to be associated with a state of inflammatory excitement in the nervous system," he virtually recognises that at least half of the whole region of pain is in a state of inconquerable insurrection against his theory, for he has given no explanation of the existence of this vast exception to it—and it may be safely presumed that if he could have given one he would have hastened to do so. After placing myself in imagination by his side in the 'region of abstract theory,' and scrutinising the entire area of the pathology of pain through his theoretical telescope, I can discover no vestige of a reason by which the existence of that

vast province of pain associated with a state of inflammation is so explicable as an exceptional phenomenon as to be reconcileable with the doctrine in question.

But while dissenting from Dr. Radcliffe's conclusions, and noting his occasional straining of facts in order to make them support his hypothesis, I feel compelled to express my admiration of the general excellence of both the method and spirit of his investigations: his work is a remarkable example of unwearying labour, patient ingenuity, and skilful selection, arrangement, and interpretation of facts seemingly subservient to the theory they are designed to support; it also displays unwavering loyalty to the theory espoused, logical acumen in the advocacy of it, and, throughout, a spirit of modesty which causes him to preface almost everyone of his numerous propositions—even the most dogmatic of them—with the formula, "It would seem." It may be true that, in practice, a man who is guided by a false theory is a dangerous man, and the more especially dangerous the more thoroughly he is faithful to it; but in the region of ideas the man who attempts the solution of hitherto unsolved problems of great practical concern, by means of a comprehensive, ingenious, and more or less logically coherent hypothesis, and who exhibits a persistent and practical allegiance to it, is a public benefactor, even though that hypothesis should prove untrue; for, whetting the appetite for facts in confirmation and in confutation of it, it awakens, stimulates, and guides observation, provokes discussion, and by the friction of thought with thought, develops that intellectual light which ultimately leads to those sound generalizations speedily recognised by all investigators as really representative of truth itself.

As in the course of this discussion, "spinal tenderness" has been many times referred to, and as the question of its nature and cause is intimately connected with the whole subject of neuralgia it seems to me expedient that I should close this chapter with a few words concerning the nature and significance of this important symptom. Of the several disorders in which it manifests itself, that which I have called 'painful excitability of the spinal cord,' is the one with which it is at once most constantly and most extensively associated: neuralgia restricted to any part of the body may be and often is accompanied with tenderness of that part of the spine corresponding to the neuralgic region; numerous disorders of the viscera—thoracic, abdominal and pelvic—even when wholly or nearly painless, are also often accompanied with similar tenderness; in chronic inflammation of the spinal cord and its membranes it is almost invariably present, and in acute inflammation of the same parts it is present in a greater or less degree in a considerable proportion of

cases. But it may be stated as a general rule that in all these cases tenderness of the spine does not become perceptible until the disease which it accompanies has already existed some time; and there is no exception to this rule, I believe, even in those cases in which spinal tenderness is the chief morbid phenomenon first observable, for it is probable that in such cases mental disease, generally in the shape of unhealthily vehement mental emotions, or morbid excitement of the reproductive organs is the precursor of the spinal affection. Now, I have stated that "the tender region is tender for one or both of the following reasons: (1) because its sensory nerve-centres are in a state of morbidly excessive excitability; or (2) because it is the seat of inflammation of some grade of intensity." Having reference to its proximate cause, tenderness may accordingly be considered under two aspects—the one neuralgic, the other inflammatory: in most cases one of these plays the chief part, in some cases perhaps an exclusive part; but, there are very few in which both causes do not co-operate to produce the result in question. When tenderness, the result of inflammation is present, it would be extremely difficult if not impossible to prove that neuralgic tenderness is not present also. In many neuralgic cases there is more or less thickening of the tissues, produced by inflammatory exudation in the neuralgic region, even when the two other conventional signs of inflammation—heat and redness, are not observable; while in all inflammatory cases it is difficult to avoid the conclusion that the centric ends of sensory nerves the peripheral ends of which are spread throughout a part in a state of inflammation must have induced in them a state of excitability corresponding with that of their outward extremities. I must also premise here, what I have already stated and explained, at page 146, viz., that in a large proportion of cases of local inflammation, pain is the precursor of the inflammation. Now, assuming these statements as truths, let us review in the light derived from them, the several examples of spinal tenderness already mentioned.

In cases of spinal tenderness associated with painful excitability of the spinal cord or with some one of the several forms of neuralgia 'neuralgic tenderness' is first developed and manifests itself as hyperæsthesia when the affected part of the spinal region is ever so slightly touched, because as already explained hyperæmia and therefore, morbidly excessive action of the sensory nerve-centres involved are first induced; but the morbidly hyperæmic state of the sensory nerve-cells becomes gradually extended to the positive motor or nutritive nerve-cells, and then their consequently morbid excess of energy is expended in producing that exaltation of the nutritive processes in the textures which immediately invest, or which are in the neighbour-

hood of the cord constituting what is called 'chronic inflammation,' and thus, superadded to 'neuralgic tenderness,' 'inflammatory tenderness' is induced. A slight preternatural fulness or puffiness along some part of the spine may often be detected. Moreover, whenever any segment of the spinal cord thus becomes the seat of hyperæmia in both its sensory and nutritive nerve-cells, that segment itself is in a state so nearly approaching that of a low grade of inflammation as to add considerably to its painfulness when subject to even slight mechanical pressure. It is notorious that in many cases of hyperæmic headache, a very slight concussion—effected by jumping, for example—causes a great and sudden augmentation of the pain: now such a concussion, when caused by jumping, means sudden pressure of the base of the skull against the base of the brain at the moment its descent is suddenly arrested when the jumper's feet retouch the ground; and this fact seems to me to justify the conclusion last mentioned in respect to the spinal cord. As already mentioned, Trousseau regarded spinal tenderness as the invariable accompaniment of neuralgia, and used that symptom as a "precious" means of differential diagnosis of neuralgia from other painful disorders; but it is clear, from what I have already said of the genesis of spinal tenderness, that, as a rule, neuralgia exists for some time as a precursor and introducer of that condition, which, therefore, during the initial stage of the disease, is worthless as a diagnostic aid.

In cases when acute meningitis or myelitis, or a combination of the two occurs as the primary disorder, the characteristic phenomena of centric disease present themselves first, and often the patient does not live long enough to permit of the development of that inflammatory state of the structures along the spine constituting the necessary condition precedent of spinal tenderness: it is, however, notorious that in prolonged or chronic cases spinal tenderness is usually a distinctive feature. Dr. Radcliffe accounts for its presence in these cases by saying it is due to the co-existence of spinal irritation, which itself is the consequence, he says, of a depressed condition of the circulation in the part affected. I presume he supposes, though he does not say so, that while one part of the cord is still inflamed, another part is in a state of anæmia, for it is difficult to conceive of the co-existence in one and the same part of inflammation, of any grade, and of irritation caused by anæmia of the nerve-centres morbidly irritable. But I venture to affirm that evidence of the co-existence of anæmia in one part of the cord with inflammation in another is not forthcoming, and that, on the other hand, there exists an enormous amount of evidence, proving that when, in cases of myelitis and meningitis, spinal tenderness presents itself, it does so precisely at those points where the inflammation is most

manifest. It thus appears that in this matter, as in many others already adverted to, much straining of the facts, and of Dr. Radcliffe's hypothesis too, is necessary before the former will admit of any sort of explanation by the latter; whereas, the explanation given above is at once co-extensive with the facts, and bears on the face of it, as it seems to me, that stamp of simplicity characteristic of truth.

Chest affections, when of long duration, are generally accompanied by spinal tenderness, observable between the scapulæ. The initial stage of bronchitis is often notably ushered in by a distressing sensation—usually of coldness—along the dorsal region of the spine, and after a time—though occasionally at the very beginning—tenderness along that region is at once made evident by pressure on it. In cases of phthisis the same fact is very frequently observable. In cases of uncomplicated bronchitis the disorder of the nerve-centres, expressing itself in the ordinary phenomena of bronchitis, is gradually extended to the nutritive nerves related to the structures contiguous to the cord, thus producing spinal tenderness; in cases of phthisis, irritation of centrepetal nerves is induced, I apprehend, by the tubercles amid which they ramify, and this exciting and producing hyperæmia of the spinal nerve-cells to which those nerves are related, is soon followed by the induction of a like condition in nutritive nerve-cells to an extent appreciable in the form of spinal tenderness. Chronic disorders of the stomach and bowels—and especially habitual constipation—is very often associated with spinal tenderness, the genesis of which is doubtless similar to that accompanying diseases of the lungs. Disorders of the reproductive organs are pre-eminently characterised by this symptom of hyperæmia of the spinal cord. In cases of habitual masturbation, productive of some form of disease of the nervous system, tenderness along the lower dorsal region of the spine is almost invariably discoverable: in these cases it is difficult, if not impossible, to avoid the conclusion that the morbid and frequently recurring excitement of the genital organs induces excitement and hyperæmia of the spinal nerve-cells related to those organs, and that the condition thus induced is soon extended to the nutritive nerve-cells of the same part of the spinal cord, thus inducing the tenderness in question. Sir James Simpson remarks that uterine diseases, after having existed a considerable time, are accompanied with tenderness of the lower part of the spine; and I have verified the truth of this observation in hundreds of cases. In the majority of these cases the tenderness is, no doubt, primarily originated by impressions which are conveyed to the cord by centrepetal uterine nerves, and which there produce reflex actions in the manner just described.

CHAPTER IX.

PREDISPOSING CAUSES OF NEURALGIA.

NEURALGIA originates in a great number and variety of ways. Its causes are sometimes exclusively local, sometimes constitutional, and sometimes of both kinds. And the operation of both is facilitated by various circumstances and conditions in life. Moreover, even in those cases in which the cause seems most exclusively local, it cannot be said that inasmuch as it produces neuralgia in one person, therefore it is capable of doing so in any other; for, on the contrary, it is well known that while one person may suffer acutely from neuralgia which has been produced by a cause purely local, and which quite subsides as soon as that cause is removed, another person may be subject to the operation of a precisely similar cause, and yet may experience no neuralgia whatever. Therefore it must be admitted that aboriginally human beings exhibit various degrees of susceptibility of pain, and that a certain constitutional proneness to suffer, from which many possess a dispensation more or less complete, is a condition precedent, or *sine quâ non*, of the genesis of neuralgia in every case. But while recognising this truth, we must be careful not to misinterpret its significance: great constitutional susceptibility of pain is not necessarily, though it is very often, a morbid condition; it may be one of the characteristics of a highly-developed organisation. The largest and most richly-endowed minds have not only the greatest capacity of mental pleasure, but of mental pain also: the one is the condition and complement of the other. And so it is with respect to the five special senses, of which that of physical feeling is chief. Apathy and intense emotional susceptibility, anæsthesia and hyperæsthesia alike merge into the region of disease where extremes meet; but in *le juste milieu* the development of mental and physical feeling is in such harmonious proportions with the rest of the organism, as, while ensuring that life shall not be unduly absorbed and dominated by it, ensures at the some time a large healthy capacity of both pain and pleasure.

While discussing the pathology or *proximate* cause of neuralgia, I have often necessarily adverted to its *predisposing* and *exciting* or *remote* causes: they are so intimately connected with each other, and indeed are, in many cases, so inseparably blended, that it is impossible to study the essential conditions of the existence

of pain without referring more or less explicitly to the numerous agents by which it is induced. Nevertheless, it seems to me expedient to consider these agents collectively; and though many of them assume a twofold character—sometimes operating as predisposing causes, sometimes as exciting causes—I shall arrange them into two fairly definable groups, viz., (1) the *predisposing*, and (2) the *exciting* causes of the malady. The Predisposing Causes will form the subject of the present Chapter.

Gout.—The gouty diathesis is commonly spoken of as a predisposing cause of neuralgia. That remarkably acute and sagacious observer, Dr. Whytt, whose admirable work on "Disorders of the Nervous System" was published more than a century ago, describes cases of neuralgia caused by gout, which, as he says, confirming the statement of Aractens, "wanders through the whole body." One of his patients, a gentleman, aged forty, generally healthy, who from June, 1752, had been troubled with pains in his heels, and sometimes in the middle of the left foot, had, in 1757, a distinct attack of gout, which removed all doubt as to the nature of his previous suffering.* "I have seen," adds this physician, "three cases of a sharp pain in the testicles from the same cause. In one of these there was a considerable swelling along with the pain, both of which went off upon the gout coming into both feet."† Sir Benjamin Brodie remarks,—"In a great number of instances nervous pains are manifestly connected with a disposition to gout;"‡ and this opinion is completely corroborated by the greatest authority on the subject—Dr. Garrod. "Neuralgia," he says, "is not an uncommon manifestation of gout, and may occur in various situations; sometimes the branches of the fifth pair are implicated, and frequently the sciatic nerve, and more rarely other spinal nerves. I have met with many instances of these different forms of Neuralgia, which are exceedingly difficult to diagnose, unless alternating with, or accompanied by, joint disease."

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"Instances of the spinal cord being implicated by gout have occasionally been noticed, and a well-marked case has come under my own care in a gentleman who suffered from pain and tenderness in the upper part of the lumbar spine, great pain in the legs, hyperæsthesia, together with extreme depression of the system.

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* "Observations on the Nature, Causes, and Cure of those Disorders which have been commonly called Nervous, Hypochondriac, or Hysteric: to which are prefixed some remarks on the Sympathy of the Nerves." By Robert Whytt, M.D., F.R.S. Third edition, p. 155, *et seq.*

† *Ibid*, p. 163.

‡ "Lectures Illustrative of Certain Local Nervous Affections." London: 1837. P. 28.

During the manifestation of these symptoms, which lasted some weeks, gout appeared from time to time in moderate intensity in both great toes, and the result of the case made it probable that it was one of gouty inflammation affecting the meninges of the spinal cord. I have also records of two other cases in which the spinal structures appeared to be attacked with true gouty inflammation. . . . Dr. Graves has also related some cases occurring in gouty subjects, in which spinal symptoms manifested themselves during life, and the cord was found softened after death."* There is, I apprehend, no source of neuralgia more fertile than that of gout; for, operating, as it does, as a degenerative influence on the vascular system, it is an extremely potent agent in effecting those irregularities of blood-supply in the nervous centres on which, when the sensory nervous centres are especially affected, the origination and persistence of neuralgia depend. Mr. Spencer Wells,† while believing it to be in some cases a product of the gouty poison, is, however, of opinion that generally in such cases, and especially when the malady is in the form of sciatica, it is immediately due to gouty deposits in the sheaths of the nerves. Such may, of course, be the fact in certain cases; but I conjecture that when gout induces persistent neuralgia, it does so in the majority of cases by impairing the walls of the terminal arteries, or capillary blood-vessels of the nervous centres, the nutrition of which, consequently, becomes modified; and this opinion receives strong confirmation from Dr. Garrod's statements just quoted. My observations dispose me to believe, however, that the children of gouty persons are more prone than their parents are to neuralgia, and, indeed, that the whole sisterhood of nervous diseases orginates very frequently from gout in the second generation. But while a general tendency to nervous diseases may become a constitutional inheritance of persons born of gouty parents, when, in a person subject to gout, that tendency has become developed into a special form—neuralgia for example—it is most likely, if visible at all in the next generation, to appear in that form. The hereditary transmission of neuralgia, however originated, is attested by many observers.

Rheumatism is mentioned by writers on neuralgia as a cause of the disease, and Dr. Fuller has devoted a whole chapter to the

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* "The Nature and Treatment of Gout and Rheumatic Gout." By Alfred Baring Garrod, M.D., F.R.S. Second edition. London: 1863. Page 513, *et seq.*

† "Practical Observations on Gout and its Complications, and on the Treatment of Joints Stiffened by Gouty Deposits." London: 1854. P. 73, *et seq.*

discussion of what he calls "Neuralgic Rheumatism;"* I have not, however, found any reliable evidence either in it or elsewhere, that rheumatism operates either as a predisposing or as an exciting cause of neuralgia. It may do so, but the proof that it does so is, as it seems to me, wanting. There are, I think, reasons for believing that both diseases are twin products of a common cause, and this opinion was probably held by Dr. Bright, who remarked, —"Neuralgia is often considered a disease closely allied to rheumatism, and appears to be so, as it frequently accompanies and often succeeds rheumatic attacks."† I am aware that Trousseau, in his lecture on "Neuralgia," devotes a special section to what he calls—"Neuralgias of Rheumatic Origin;"‡ but though he adduces, in support of his view, a striking case illustrative of the co-existence or alternate manifestation of rheumatism and neuralgia in one and the same patient, this fact does not seem to me to invalidate but rather to strengthen the opinion I have just expressed. I must, however, reserve this interesting and, indeed, in a therapeutical point of view, important question for full discussion on a future occasion.

The Cancerous Diathesis, of which Fothergill believed neuralgia to be a product, has, in my opinion, only the same causal relation to neuralgia which it may be supposed to sustain to several other neuroses, whatever that may be. But I may state here that certain well-established facts connected with cancer seem, at least, to afford some ground for the belief of that eminent physician, and that, *mutatis mutandis*, the remark just made concerning the causal relations of rheumatism and neuralgia also applies to the relation between cancer and neuralgia. That cancerous tumours grow by virtue of morbidly excessive energy of trophic nerves is a proposition in support of which much evidence may be adduced.

Pulmonary Tubercles. — No carefully-observant physician, studious of the phenomena of neuralgia, can fail to be struck with the fact of the frequent co-existence of that disease and tubercles in the lungs; and much attention to the subject has impressed me with the conviction that the tubercles and the neuralgia in these cases are causatively connected. Generally

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* See the Chapter on "Sciatica and other Forms of Neuralgic Rheumatism" in Dr. Fuller's work "On Rheumatism, Rheumatic Gout, and Sciatica, their Pathology, Symptoms, and Treatment." Third Edition. London: 1860.

† "Reports of Medical Cases, selected with a view of illustrating the cure of diseases by a reference to morbid anatomy." By R. Bright, M.D., F.R.S., &c. 4to. Vol. II., Part II., page 501.

‡ "Lectures on Clinical Medicines." By A. Trousseau. Translated by P. V. Bazire, M.D. Part II. London: 1867. Page 491.

speaking, the patient describes the pain complained of as located in some part of the walls of the chest; occasionally the upper extremities are affected; and Dr. Richardson speaks of "the toothache common to phthisis."* In almost all cases of neuralgia, associated with phthisis, the pain is prone to shift from one part to another, and usually, instead of being acutely paroxysmal and periodical, is dull and continuous. In every case in which I have examined the spine, I have found more or less tenderness of the dorsal segments—tenderness which in many cases was extremely pronounced when pressure was made along the spines between the scapulæ. The notoriously common phenomenon—profuse perspiration, especially of the surface of the chest, generally observable in these cases, is the analogue of that excessive glandular activity often notable in other parts as a concomitant of indubitable neuralgia, and like it, is, I apprehend, immediately referrible to spinal hyperæmia, the common source of excessive secretion and of excessive sensation—or pain. Now, pulmonary tubercles are certainly capable of producing such hyperæmia, and, indeed, it is almost impossible to conceive of their presence without at the same time recognising that they must exert an irritative influence thoroughly adequate to produce it, and, therefore, that they must often operate as predisposing causes of neuralgia, and, in a certain class of patients, as exciting causes also.

Congenital Arterial weakness resulting in Temporary Aneurismal Dilatations within the Nervous Centres.—The existence of such dilatations is not provable, but in my opinion there are valid reasons for believing in their frequent occurrence. Just as the voluntary muscular system differs in different individuals in respect to massiveness, strength, and mobility, so in the like respects does the involuntary muscular system of different individuals also differ. Every medical man knows how wonderfully the heart of one person differs from that of another in size, strength, and rapidity of action; and, inasmuch as aboriginally the heart is but a sanguineous tube bent on itself, a consideration of the varieties of size, strength, and activity of this organ at once suggests the idea that the sanguineous tubes throughout the body also vary to a corresponding extent in the same respects in different persons; and this suggestion is countenanced by several facts which are being constantly observed. If the pulse be carefully examined in each of a dozen healthy persons, it will be found to present special characteristics in each case—characteristics which owe their origin, in great measure, to the size, dilata-

* "The Medical History and Treatment of Diseases of the Teeth." P. 72.

bility, and contractibility of the arteries themselves. Everyone knows with what astonishing rapidity the capillaries of the skin may be filled to excess with arterial blood, and how suddenly it may be excluded from them; and everyone knows equally well how extraordinarily great are the different degrees of liability of different persons to these varieties of peripheral circulation, manifested when excessive by blushing, and when defective by pallor. Of course, I am aware that an excessive mobility of the blood-vessels may be due to the conjoint and equal operation of two widely different causes, or may be almost exclusively the product of only one of them: it may be due to constitutional weakness of those vessels, which thus becomes excessively responsive to nervous stimulus; or it may be due to an excess of vaso-motor nervous energy, which is capable of causing even the most normally constituted arteries to manifest an abnormally great degree of mobility. I apprehend, however, that in a considerable proportion of cases, the excessive mobility in question is mainly due to aboriginal weakness of both the arteries and capillaries; and the recognition of this fact is all that is necessary to justify the supposition that in the nervous centres, where the supply of blood is enormous, and where its local fluxes and refluxes in correspondence with functional changes quick as thought itself, are marvellously sudden, the weakest points of aboriginally weak capillary vessels may so far yield and give way to internal pressure as to produce, at those points, that amount of distension which may be fairly called aneurismal. Of course, tiny microscopic aneurisms of this kind thus produced only swell out to their fullest possible dimensions when strong drafts are made on the blood in them by the surrounding nerve-cells at the moment they are functioning most vigorously: but, at all times after these widenings of the capillary tubes at special points of weakness have once been effected, a certain amount of abnormal or aneurismal dilatation at those points is almost sure to remain; and as these permanent widenings of the capillary channels enable the groups of nerve-cells immediately surrounding them to receive a greater supply of blood than before, a condition of preternatural nutrition and functional energy of those cells is established, while, on the other hand, the persistence of these widenings precludes the possibility of shutting off the blood from those groups of nerve-cells, and thus of ensuring their quiescence from time to time—an essential condition of their permanent healthiness. Now, if the nerve-cells surrounding such aneurismal dilatations of capillary vessels happen to be sensory, those dilatations constitute one of the most potent predisposing causes of neuralgia, and one, the removal of which is peculiarly difficult.

Vascular Degeneration resulting in Permanent Aneurisms within the Nervous Centres.—The minute capillary dilatations described

in the preceding section are scarcely likely to be seen during *post-mortem* examinations; for it is probable that when the capillaries, not injured by interstitial deposits or fatty degenerations, become empty, or nearly so, as they do after death, their widened parts contract, if not to their normal size, to such an extent, at least, as to preclude the recognition of any definite traces of the little abnormal swellings in them which had existed during life. But whether such traces be actually discoverable or not, it is certain that capillary dilatations, resembling minute aneurisms, have been observed in considerable numbers in the brain; and, if observed in the brain, we may reasonably infer that they may be found not unfrequently in the spinal cord, and sympathetic ganglia also. It is probable that in such cases their existence is due to partial disorganisation of the capillary walls, effected either by fatty or by gouty degeneration; and when such disorganisation has been effected, the chances of repair being extremely small, the consequent swellings are almost sure to persist until actual rupture of one or more of them, or until death itself occurs. The *rôle* of these dilatations in the production of neuralgia is, of course, the same as that of those described in the previous section; but, inasmuch as they are of a more pronounced and permanent character, their effects must be correspondingly more grave.

Alternations of Temperature ("*Malaria*").—Dr. Macculloch, whose elaborate investigations, great sagacity, and remarkable faculty for scientific generalisation, manifested throughout his work on "Marsh Fever and Neuralgia," must always command respectful attention to his conclusions concerning those maladies, was one of the first, if not the first, who demonstrated that "intermittent fevers, more or less distinct," are often accompanied by neuralgia, "whether these consist of simple pain, or are attended by inflammation;" that various local affections of the nervous system, and notably those constituting the neuralgic group often alternate with intermittent fevers—the supervention of the former being simultaneous with the removal of the latter; that neuralgic disorders are prone to alternate with other local affections of the nervous system; that "many of the neuralgiæ will exist almost simultaneously, or else in alternating paroxysms, these having many of the types of intermittent;" that "malaria will produce the neuralgic diseases directly, as, probably, will mere cold;" that "they are renewable by mere cold when once they have existed;" and that "the same malaria, in the same spot, acting on different individuals at the same time, will produce either intermittent or neuralgia, and every form of each."*

* "An Essay on the Remittent and Intermittent Diseases, including generically Marsh Fever and Neuralgia." By J. Macculloch, M.D. Vol. II., pp. 335-6.

It is undoubtedly true that neuralgias of "malarious" origin are much less prevalent in England now than they were half a century ago: in proportion as the amount of land subjected to drainage and cultivation has increased intermittent fevers and neuralgias, due to the same causes as those fevers, have become less frequent; but the fact that in a considerable number of those cases of neuralgia now observable periodical, and often strikingly regular, recurrence of the paroxysms is a characteristic feature justifies the suspicion that causes similar, at all events, to those productive of intermittent fever, are still operative to an appreciable extent in non-"malarious" districts. In Dr. C. Handfield Jones's valuable chapter on "Malaroid Disorder," he adduces some impressive evidence directly bearing on this question.* He gives several cases which, as he says, "seem sufficient to prove that London, during the last twelve or fifteen years, at any rate,† has been capable of generating an influence giving rise to well-marked ague;" and in a case of a tertian ague, which, after continuing nine weeks, ceased while under treatment, "neuralgia of both sides of the chest, at the lower parts, with sinking sensation, and occasional burning heat flushes" came on, had persisted "ever since" —up to the date of the report: in a case of "marked quotidian ague," which came on for the first time in a man who had previously been in London eight years, the attack was preluded by "rheumatoid swelling and pain of hands," which lasted about fourteen days. Persons who have had ague abroad, or in an English district where it is more or less endemic, are especially liable to neuralgia, even though in a part of the country, or in a town where, as is generally believed, ague is never generated. Dr. Jones mentions the following instructive instance:—A medical friend of his, "who had twice had ague, and had resided in a malarious district, but had been for some time in London, experienced for three consecutive mornings chills, occurring at 11 a.m., on the fourth morning he had instead acute neuralgia of the neck and shoulder at the same hour, on the fifth he had neither chills nor neuralgia but epistaxis, at the same time; he had not provoked it in any way."

In the majority of cases in which neuralgia of a *regularly periodic* type is experienced by persons living in non-"malarial" districts, and who have not suffered from ague elsewhere, the development of the neuralgia is likely to be due to the same cause as are those obscure and slightly characterised, but

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* "Clinical Observations on Functional Nervous Disorders." First Edition, p. 481, *et seq.*

† This passage was written not later than 1864, when the first edition of Dr. Jones's book was published.

nevertheless indubitable forms of intermittent disorder recognisable in non-"malarial" districts, and that cause is, in all probability, simply thermal. If so, the nature of the predisposing cause in these cases becomes apparently identical with that which the most authoritative writer on neuralgia, Valleix, has pointed out as one of the most prolific sources of the disease. Under the heading, "*Influence of the Seasons*," he gives (at page 696) 125 cases in which the beginning of the malady had been accurately ascertained, and of those, the number originating in each month of the year is shown in the following table :—

Months.	Number of Cases.	Months.	Number of Cases.
		Brought forward ...	73
January	29	July	5
February	10	August	4
March	11	September	8
April	8	October	8
May	8	November...	16
June	7	December	11
Carried forward ...	73	Total	125

According to this table, more than half of all the cases began during the winter third of the year, viz., in November, December, January, and February; and nearly a fourth of the whole of them began in a single month, January, the coldest one in the year. These results are strikingly accordant with the opinion which seems to be steadily gaining ground that intermittent fever itself is really caused by the unduly rapid abstraction of heat from the body, the so-called "malarial" regions being such only because they present, in a pre-eminent degree, those conditions most favourable for the rapid, or more or less sudden, withdrawal of animal heat. Macculloch himself believed cold to be capable of generating intermittent fever;* M. Brachet, of Lyons, produced the disease in himself by bathing for seven successive nights, at midnight, in the river Saone;† bathing in hot climates has in numerous instances appeared to cause the disease; and the great mass of evidence collected by Mr. Oldham seems fairly to substantiate the main proposition of his original and very valuable work, viz., "*that malaria, as a specific poison, does not*

* See his Chapter on the "Connection of Neuralgia and Intermittent." Vol. II., p. 334.

† "Observations et Recherches sur les Fièvres Intermittentes." P. 370. Quoted by Mr. Oldham.

exist; but, *that the cause of the diseases attributed to it is chill, or, in other words, the sudden abstraction of animal heat.**

Diurnal Variations of Liability to Neuralgic Attacks are experienced by many patients in whom, so far as ascertainable, alternations of temperature did not originate the disease, and do not induce fresh paroxysms. One of my patients experienced a paroxysm each evening at twilight, another at a late hour each night, or immediately after going to bed, another in the night at any time after having slept for a time, another as soon as she awoke in the morning. In one of Sir Charles Bell's cases the attacks came on whilst the patient was at dinner.† Concerning another he writes: "The pain is periodical; it has not varied, in the time of its return, five minutes for eleven weeks. It attacks her at one o'clock in the morning, whether she be asleep or awake." Speaking of another patient, he says, "His pain attacks him in the morning, and especially if he has been lying on his back; after an hour it becomes worse, and at mid-day rages terribly." The causes of these variations are probably almost as various as the variations themselves, and can only be approximatively ascertained by special inquiry into each case. In the first of the cases just mentioned the patient was employed in a workshop lighted at night with gas: the air of the room was contaminated by the products of gaseous combustion, and I incline to believe that these products contained in the air which he breathed each evening induced his attacks. Of course the gas was lighted at twilight, and quickly afterwards, with surprising regularity, his torment recurred. It seems to me not unlikely that the imperfect aeration of the blood, resulting from breathing the impure air, produced a slight congestion of the nervous centres in this patient, a congestion which, though very slight, was enough to resuscitate the pain, to the existence of which, in him, a strong predisposition already prevailed. In the case of the lady, mentioned by Sir Charles Bell, who was attacked whilst she was sitting at dinner, it may be that the action of the nervous centres originating movement of the jaws or tongue, or some pleasurable emotion connected with eating her dinner favoured the production of a paroxysm. The remarkable regularity with which the attacks occurred at "one o'clock in the morning," in the other case cited from Sir Charles Bell, certainty suggests the idea that the disorder may have been of "malarial"

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* "What is Malaria? and why is it most intense in hot climates? An inquiry into the nature and cause of the so-called marsh poison." By C. F. Oldham, M.R.C.P.E. London: 1871, p. 69.

† I have now (August, 1871) a case under my care in which taking lunch generally brings on an attack: how it is thus induced I cannot discover.

origin; but it is quite possible that some other cause, which might have been discovered at the time, but which is now unascertainable, may have produced these regular midnight paroxysms. The other cases mentioned in this section though seeming to exemplify the operation of causes predisposing the patients at particular periods of the day, and while awake, to become victims of neuralgic attacks, are only correctly explicable, I believe, by a consideration of the causal relation existing be- the onset of neuralgia and the peculiar physiological conditions of the nervous centres which induce, and are associated with, normal sleep.

Sleep, when healthy, commonly takes place, as observed by Blumenbach,* and as subsequently demonstrated by Mr. Durham's admirable vivisectional experiments on animals,† when the cerebrum is receiving a supply of blood less than that which circulates through it during its state of normal wakefulness. The reality of this discovery I have verified hundreds of times by decreasing the amount of blood in the human brain. But though during normal sleep the amount of blood in the cerebrum is at its minimum, that in the ganglia of the sympathetic is at its maximum, while that in the spinal cord is probably greater than during the hours of wakefulness, and when the organism is in a state of tranquillity. During sleep, respiration, oxygenation, and circulation are diminished; the amount of carbonic acid expired is consequently lessened, and the temperature of the body falls to an appreciable degree. Now, the diminution of the amount of blood in the brain and in the surface of the body, and the diminution of the functions of respiration, and, therefore, of oxygenation and circulation of the blood, are evidence of, and indeed are produced by an increase in the nutrition and functional energy of the sympathetic ganglia. And by virtue of the principle that when a particular condition of circulation and nutrition, whether defective or excessive, great or small, obtains in any given part of the body, that condition tends to spread itself to proximate parts, I infer that the spinal cord, which has a chain of the sympathetic ganglia on each side of it,

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* Blumenbach relates a case of a person whose skull had been trepanned, and whose brain was observed to sink whenever he was asleep, and to swell again with blood the moment he awoke. Blumenbach inferred from this that a diminished supply of blood to the head is the proximate cause of sleep. I am indebted for the account of this original observation and inference to a valuable Essay on "Sleep and its Phenomena." By J. M. Pinkerton, M.D. London: 1839, page 8.

† See the account of them in "Guy's Hospital Reports." Also in an article entitled, "The Physiology of Sleep," published in the *Westminster Review*, New Series, Vol. xxv.

and which, functionally, is very closely related to those ganglia, is also hyperæmic during the state of sleep. And this inference is justified by other considerations.

In many cases, and, I believe, precisely in those in which sleep is most healthy, there is free, but not excessive perspiration, the skin being suffused with what is supposed to be a healthy moisture, while often, in cases of consumption, there is profuse sweating during sleep ; now I am prepared to show that the function of perspiration is performed at the bidding of the spinal cord ; therefore, inasmuch as that function is more active during sleep than during the wakeful state, notwithstanding the fact that the temperature is usually lower in the night than in the day time, it is evident that the spinal cord is most vigorous during normal sleep. It is well known that the stomach is copiously innervated from what Dr. Marshall Hall calls "the true spinal cord," and though it may not be equally well-known it is none the less true that digestion is most effectually accomplished during sleep. This result is, however, partly due to another cause : inasmuch as during sleep there is a minimum amount of blood in the brain, the stomach is then the more easily able to draw to itself that full supply of blood necessary for the efficient performance of its function. Pregnant women, who suffer from the sickness so often associated with gestation, feel sick, and vomit only, as a general rule, during a short time each *morning*, and hence the common name of the disorder—"morning sickness." This remarkable phenomenon is, I believe, an expression of the fact that during the night the spinal cord attains its maximum amount of energy, and, therefore, as soon as the patient wakes is most prone to function with that amount of vigour which transcends the bounds of health. I may add, here, respecting one of my patients suffering from this form of sickness, that if she woke in the night she was sick. That the force effecting the functions of the bowels is as much cerebro-spinal as is that effecting the gastric functions is proveable by a large array of authentic observations, and the fact that the function of the bowels is most energetic and most perfectly performed during the night is so evident as scarcely to need any demonstration. I may, however, point to the habit, almost universal, of defecating in the morning—a habit which denotes that the fæces are accumulated in the colon by the action of the small intestines especially during the night. The notorious frequency with which attacks of diarrhœa and cholera begin at the period which is usually that of profound sleep—viz., between two and four a.m. is a fact of the same kind. The reproductive system affords unmistakeable illustrations of the truth here contended for. It may be safely affirmed, I be-

lieve, that the energy and excitability of the sexual organs is greatest during the night; but, without insisting on this point, I need only mention two well-known facts, the significance of which can scarcely be misapprehended: as a general rule, persons troubled with involuntary seminal emissions experience them during sleep, and during those hours of early morning, when sleep may be presumed to be most profound; and though I possess no statistical data in support of the assertion, I believe it is true that the number of pregnant women who experience the first pains of labour during the hours between two and four a.m. is very much greater than is the number of those who experience those pains during any other two consecutive hours of the day or night. The chief element of epilepsy is hyperæmia of the spinal cord, and it is notorious that the paroxysms of this malady have an especial tendency to occur during sleep, and that in some patients they rarely or never occur except during sleep. Of course, the fact that such is the case is a proof that, relatively to the brain, the cord is especially hyperæmic during sleep. Many other facts might be adduced in confirmation of the doctrine expressed in this section; but those already cited suffice to indicate that, according to the pathology of neuralgia, explained in chapter III., the condition of the spinal cord during sleep is peculiarly favourable for the development of neuralgic attacks.

The patient mentioned above, who had an attack at a late hour each night, also suffered from painful excitability of the spinal cord generally, and it seems to me not improbable that with her extreme proneness to neuralgia, the recurrence of the first stage in the return of the physiological conditions constituting sleep—viz., that denoted by the term sleepiness, was sufficient to ensure a fresh attack. The case in which pain came on in the night, after the patient had slept for a time, and the one in which it came on as soon as the patient awoke in the morning, are cases in which, as it seems to me, different amounts of actual sleep acted as the causes of the paroxysms. In the case recorded by Sir Charles Bell, of the man who was attacked in the morning, and especially if he had been lying on his back, it seems as if the hyperæmia of the spinal cord associated with sleep was often sufficient to induce a paroxysm; but it also seems as if not infrequently that amount of hyperæmia did not suffice to produce a paroxysm which, however, was ensured when the patient had not only slept throughout the night, but had lain on his back meanwhile—a fact constituting an interesting confirmation of the doctrine here insisted on.

Over-exertion and Fatigue, bodily and mental, undoubtedly operate both as pre-disposing and exciting causes of neuralgia.

The vigorous circulation in the motor-nervous centres incident to muscular action, and in the brain incident to mental work, can scarcely fail to extend itself to the neighbouring sensory centres, and thus to produce in them that condition of active hyperæmia which especially favours the genesis of neuralgia.

Mental Depression is itself a form of hyperæsthesia, a sort of generally diffused excess of feeling; it is therefore easily conceivable how thoroughly conducive it is to the production of that special and distinctly localized excess of feeling constituting neuralgia; and certain it is that of all the various causes of the malady which may be enumerated there are few, if any, at once so potent, so frequently operative, and so difficult of detection and counteraction as that of mental depression.

Age.—If toothache and the pains incident to dentition be excluded from consideration, then there can be no doubt but that neuralgia is pre-eminently a disease of the middle and most vigorous period of human life. The only available statistics known to me illustrative of this question are those given by Valleix. I have kept no statistical record of the ages of my own neuralgic patients, but, decidedly, my belief is that had I done so my experience would have been found substantially accordant with that which he has tabulated; I therefore reproduce his figures together with a translation of the remarks accompanying them. He says: "I know of only one case of neuralgia developed in childhood; that was a case of lumbar neuralgia which occurred in a girl five years old. During the second childhood this affection is met with a little oftener, but still very seldom. It is only dating from the period of adolescence that neuralgia manifests itself sufficiently often to be no longer regarded as an exceptional affection. I have put together in the following table two hundred and ninety-six facts which may serve to exhibit the influence of age. The observations refer to neuralgias of all kinds:—

From	1	to	10	years	2
,,	10	,,	20	,,	22
,,	20	,,	30	,,	68
,,	30	,,	40	,,	67
,,	40	,,	50	,,	64
,,	50	,,	60	,,	47
,,	60	,,	70	,,	21
,,	60	,,	80	,,	5
				Total	296

This table is remarkable, because it shows that the three periods comprised between twenty and fifty years present numbers almost identical, and that the number of neuralgias contained in these three periods forms two-thirds of the total number. Moreover,

in considering the principal kinds of neuralgia separately we obtain analogous results, so that it may be said (1) that the influence of age does not vary from the twentieth to the fiftieth year, and (2) that this pre-disposing influence is more marked during this long period of life than during all the others."*

Sex.—My own experience leads me to believe that a greater number of women than of men suffer from neuralgia, and the conviction that such is the fact derives confirmation from the consideration that throughout the whole menstrual epoch, and especially during the period when the menstrual function is finally declining, women are peculiarly liable to those irregularities of the circulation—those tumultuous affluxes and effluxes of the blood-currents—now in one part, now in another, and especially in the nervous centres, which are peculiarly favourable conditions for the production of neuralgia. Moreover, it is, I think, probable that if suffering women were to complain of pain as quickly and as loudly as men do when they suffer from it, the number of women relatively to that of men would appear considerably greater even than it does now. But at all events the statistical evidence on this point collected by Valleix is accordant with the opinion here expressed. Of 469 cases analyzed by him the malady appeared in the two sexes relatively as follows :—males, 218; females, 251. According to a table supplied by the same author women suffer most frequently from facial, intercostal, and lumbo-abdominal neuralgia ; and men from sciatica.† Any positive conclusion drawn from the small number of cases given in his tables would, however, be at least premature ; a much larger number is necessary as a basis for a reliable generalization concerning the points in question.

Constitutional Condition.—"I only possess," says Valleix, "a small number of facts showing the frequency of neuralgia in connection with special constitutional conditions; in the cases in which details are furnished we find the following indications :—

Robust constitutions	48	cases.
Mediocre ,,	15	,,
Bad ,,	4	,,

It seems, therefore, that a weak constitution does not at all predispose to neuralgia ; nevertheless, I do not hide from myself how much the elements of conviction on this subject are wanting, and I only give these results as provisional."‡ On the other hand, Dr. Anstie affirms it to be "universally the case that the existing condition of the patient at the time of the first onset of the

* "Traité des Névralgies," pp. 689, 690.
† *Ibid*, pp. 690, 691.
‡ *Ibid*, p. 693.

disease is one of debility, either general or special." He adds,—"In the first place, it is certainly the case that the larger half of the total number of patients coming under my care with various forms of neuralgia are either decidedly anæmic or have recently undergone some exhausting illness or fatigue : and the reason why Valleix did not find so many cases of this type among his neuralgic patients appears certainly to be, that he limited the neuralgic class of diseases by an artificial definition, which we shall have to reject as untenable. On the other hand, although a considerable number of neuralgic patients are so far healthy in appearance that they have a fairly ruddy complexion and a good amount of muscular strength, it is impossible to admit that these facts disprove the existence of debility, either structural or functional *in the nervous system*, for the commonest experience teaches that such debility does frequently co-exist with a great robustness and development of the apparatus of vegetation and the lower forms of animal function. And it will invariably be found, on carefully examining these apparently robust neuralgic patients, that the nervous system has given warnings of its weakness."*

Of course the question, whether or not constitutional debility operates as a pre-disposing cause of neuralgia, is simply a question of fact. Dr. Anstie explains the discrepancy between the facts observed by himself and those recorded by Valleix by the hypothesis that Valleix limited the neuralgic class of diseases by an artificial definition which he, Dr. Anstie, rejects as untenable, and that though neuralgic patients may often appear robust, they are not really so. I entirely concur with Dr. Anstie in thinking that Valleix excluded from his definition of neuralgia a large number of painful disorders which are really neuralgic ; but there can be no reasonable doubt that every case recognised by Valleix as neuralgic certainly was so, and, moreover, was a case which, if considered relatively to the great majority of cases now regarded as neuralgic, would be accounted as especially severe. It thus appears that according to Valleix a large proportion of those patients suffering from neuralgia of an especially severe type were constitutionally robust. So far as I have observed, my observations most certainly tend to confirm the experience of Valleix rather than that of Dr. Anstie ; and I must add that I have seen several cases of very severe neuralgia in which the patients not only seemed constitutionally robust, but really were so. I make this statement with the utmost confidence, because the patients to whom I refer and who seemingly experienced good general health while liable to neuralgic attack, did most assuredly

* Art. Neuralgia, in "A System of Medicine." Edited by J. R. Reynolds, M.D. Vol. II., p. 718.

enjoy good health, and exhibited all the usual evidences of constitutional robustness when by treatment they had been freed from their neuralgic torments. My own experience, as well as Valleix's, in this matter is strikingly corroborated by a consideration of the periods of life when neuralgic attacks are at once the most frequent and the most severe. As already stated, Valleix's statistics prove that out of 296 cases of the disease more than two-thirds of them occurred during the most vigorous period of life, viz., between the ages of twenty and fifty. The fact, mentioned by Dr. Anstie, viz., that in a large number of cases, "the attack of acute pain was immediately ushered in by a remarkably *anæsthetic* condition of the parts about to become painful," is, in most cases, when rightly interpreted, very far from favouring the theory he espouses: instead of proving the weakness, it proves the strength of the *nervous system* of the patient; for it simply denotes that the vaso-motor nerve-centres related to the affected part are functioning *with such excessive energy* as to cause the arteries of the part to contract so considerably as to deprive the sensory nerves ramifying through it with a supply of blood adequate to enable them to perform their normal function, and hence local anæsthesia is the inevitable result. By *lessening* the energy of the vaso-motor nerve-centres related to the anæsthetic part, through the *sedative* action of the Spinal Ice-bag applied over them, I have in numerous cases abolished the anæsthesia completely. Of many of these cases I have accurate records, which state the æsthesiometric changes observed during the course of the treatment adopted.

Hereditary Predisposition.—Cases in which a special liability to neuralgia has been directly transmitted from parent to child sometimes occur; and that, as a general rule, diseases of the nervous system are transmissible, and are very often transmitted, experience certainly proves. It proves not less certainly, however, that the morbid characteristic transmitted in each case consists less in a distinct tendency to reproduce the special disease from which the parent suffered, than in a general proneness to disorder of the nervous system, the peculiar manifestation of which in each case depends in great measure on the nature of the cause or causes by which that general tendency, more or less latent, is called into special activity. "I have been at the pains," says Dr. Anstie,* "to investigate a hundred cases of all kinds of neuralgia, seen in hospital and private practice, with the following results:—twenty-four gave distinct evidence that one or other parent had suffered from some variety of neuralgia; fifty-eight gave a distinctly negative answer; and eighteen would not undertake to give any answer at all."

* "Neuralgia and the Diseases that Resemble it." P. 111.

CHAPTER X.

THE EXCITING CAUSES OF NEURALGIA.

The agencies commonly designated "exciting causes" of neuralgia are very numerous, and are especially remarkable by their great variety of character. Indeed, many of them are the products of accidental circumstances very unlikely to happen in the same relation to each other more than once. But though these causes are so numerous and so various that it is impossible to describe all their forms, the following sketch will suffice, I believe, to give a fairly correct notion of their general character, and mode of action.

Dental irritation.—Of all the different agencies productive of neuralgia, this is recognised as chief. In a large proportion of cases, as soon as the teeth of the infant begin to appear, irritation is conveyed from them to the medulla oblongata, is reflected in various directions, causing various maladies, especially diarrhœa and convulsions, and is accompanied by unmistakeable, and often great, suffering. At all periods of life diseases of the teeth very frequently produce neuralgia, and not only in the teeth specially implicated, when the pain is of that concentrated kind called toothache, but also, by reflex action, in healthy teeth, as well as in other parts innervated by the fifth nerve.

Macculloch has occupied a whole chapter in proving, in his discursive but entertaining manner, the identity of toothache and neuralgia; and I suppose that when those ideal or fanciful types of neuralgia, which are still generally imaged in the professional mind and portraited in professional books, shall have melted away and given place to more correct conceptions, toothache will, in fact, come to be generally regarded as an example of neuralgia not less indubitable and perfect than the most "immaterial" forms of it adducible by the most idealistic physician. Readers acquainted with Dr. Macculloch's work expect him to descry the agency of "malaria" in the production of toothache, as, indeed, he does much oftener than experience warrants. Nevertheless, he is fully sensible of the operation of other causes, as will be seen from the following extract: "Neuralgia is produced by the injury of a nerve. So is toothache: and this is the case of a carious tooth. And if toothache from this cause is espe-

cially frequent, it is that the caries of a tooth is very common; and that there are not, in external circumstances, or in the body, any frequent means of thus injuring, either through accident or disease, the branch of a nerve elsewhere."* When a dental nerve is thus injured, the most common effect is pain in the carious tooth; but the injury may, and often does, operate as a cause of neuralgia in parts more or less remote from it. In the majority of such cases, the effect becomes manifest in other teeth: sometimes in the same gum in which the carious one is; sometimes in the other; and most frequently in "the opposite tooth in the same jaw, or in the opposite one. Thus, from the decay of the first molar in the lower jaw, right side, the pain will be felt in the first molar on the left side of the same jaw, or in the right first molar of the upper jaw."† Very often no vestige of disease can be found in the tooth or teeth in which the pain is experienced. In such cases the pain is designated by Dr. Goddard "false odontalgia." Adverting to the useless treatment of neuralgia of this kind by extracting sound teeth, Macculloch observes, "I need not allude to a stronger proof of the general error than the case of a late esteemed and lamented physician, himself of the highest rank, and surrounded by the whole profession; since, together with a division of the nerve, he submitted to the loss of eight teeth, and yet died, it is said, of a disease which there is every reason to believe might have been cured under juster views, or under which life, at least, would not have been sacrificed." We are not informed whether, in this case, the sound teeth which were extracted were seats of pain, but they probably were; and, at all events, thousands of sound teeth have been extracted, because they were unendurably painful: some time ago I was consulted by a patient (a young woman) whose lower jaw had been deprived of every tooth in it by the advice of a London Physician, in order to cure the neuralgia from which she suffered! But she was not thus cured; and she assured me that nearly every tooth was perfectly sound. "I have under my notice at this time," says Dr. Richardson, "the case of a lady who, during years of suffering, has had every tooth in her jaws, on the affected side, one by one, extracted. There is no relief."‡

By the light of the pathology of neuralgia already explained, it is easily intelligible that if the irritated nerve

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* "Marsh Fever and Neuralgia." Vol., II., p. 243.

† "The Anatomy, Physiology, and Pathology of the Human Teeth, with the most approved methods of Treatment." By P. B. Goddard, M.D. Aided in the Practical Part by J. E. Parker, Dentist. New York: 1854, p. 91.

‡ "On the Medical History and Treatment of Diseases of the Teeth." By B. W. Richardson, M.D. P. 61. London: 1860.

of a diseased tooth is allowed to continue for a considerable time propagating its irritation to the centric cells of the fifth nerve, the morbidly excessive nutrition and activity of those cells consequent on that prolonged irritation, may easily be developed into a habit capable of persisting long after the original cause of the irritation has ceased to operate.* Dr. Hunt reports the following cases. A gentleman, suffering from tic douloureux, had a tooth extracted. It was "covered with a lamina of bone, and had caused the pain. By the removal of the tooth he was relieved, but for some time exposure to cold gave him pain from the shock of the original disease." A lady, suffering in the same way, "was quite convinced that the pain always commenced in the last molar tooth," pressure on which "immediately provoked a paroxysm. The tooth was, therefore, removed, and, although perfect on the crown, the fangs of it were rough and scabrous. The extreme violence of the paroxysms was relieved by the extraction of the tooth, but they returned regularly until subdued by large and repeated doses of belladonna, which medicine had been previously given without affording relief."† Moreover, the state induced in the centric cells, morbidly influenced, may be, and often is, extended to neighbouring cells related to other roots of the fifth nerve than those first affected, and then, of course, the resulting pain will be referred to other branches of that nerve—branches supplying teeth which, in all probability, present no trace of disease, or parts of the face or scalp previously quite free from pain. But the more impressionable and excitable the nervous system is, the more capable it is of propagating irritating impressions from one group of sensory nerve-cells to adjoining groups of cells, both sensory and motor, and also, by intermediary fibres, to groups more or less remote.

In childhood, when the nervous system is growing with great rapidity, and when, therefore, being most abundantly supplied with blood, it is most vital and most impressionable, the excitement of branches of the fifth nerve incident to teething not only results in pain referred to the gums; in reflex action, through the nutritive nerves, causing inflammation of the gums; and in reflex actions, through the secretory nerves, causing the oral mucous membrane and salivary glands to pour out a morbidly excessive

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* One of Sir Charles Bell's cases (No. 87) exemplifies this truth. The patient had a tooth stopped; from that time she became a sufferer from very severe tic douloureux, and though she had the tooth removed, the pain which it originated continued.—"The Nervous System of the Human Body," p. 363.

† "On the Nature and Treatment of Tic Douloureux, Sciatica, and other Neuralgic Disorders." By Henry Hunt, M.D. London: 1844, p. 111.

quantity of their peculiar products; but also in reflex actions of much more remote parts. Disturbances of the voluntary muscles in the form of partial or general convulsions are often thus induced. That troublesome malady—excessively frequent micturition is often caused in the same way.* And, still oftener, that preternatural action of the mucous membrane, and of the muscular coat, of the bowels, constituting diarrhœa, is a consequence of extensive nervous excitement, originating in the nerve-filaments distributed to the gums; and we know that pain, expressing itself by restlessness, fretfulness, and crying, is a frequent concomitant of the various infantile disorders which that excitement produces.

As age advances, the area of the reflex actions, originating in irritation of the branches of the fifth nerve, becomes, as a rule, more and more circumscribed (though it remains permanently greater in women than in men); nevertheless, cases not infrequently occur in which irritation from a diseased tooth produces morbid phenomena at a considerable distance from itself. The following very remarkable and very instructive case of this kind is narrated by Dr. Campbell:—"A few months since, we were in attendance upon a case, wherein an eye, which had previously been operated upon, after entire immunity from disease of every kind, became first slightly affected with linear congestion, the lachrymal secretion was greatly increased, then it became painful and bloodshotten, with slight ulcerations upon the cornea. This condition had continued for over a month, when, at the suggestion of a distinguished friend (Professor Paul F. Eve, of Nashville, Tenn.), a *carious* tooth was extracted from the upper jaw of the side corresponding to the affected eye. The result was most marked and satisfactory; the pain, the flow of tears, and the congestion, rapidly subsided, the parts regained their natural state, and the patient was entitely relieved."† The following case is recorded by Dr. Koecker, whose account of it I have abridged. Miss G., of Philadelphia, about sixteen years old, "was troubled with a complaint in her ears, attended with severe pain and discharge of yellowish matter from them, difficulty of hearing, much general debility, and great depression of spirits. No means had been omitted to obtain the best

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* Dr. Henry F. Campbell, of Georgia, states, that noticing the co-existence of dental irritation and morbidly frequent micturition in a child, first induced him to reflect on the causative relation between the nervous system and the function of secretion.—See his letter to Marshall Hall claiming the "priority in the discovery and naming of the excito-secretory system of nerves." 1857.

† "Essays on the Secretory and the Excito-Secretory System of Nerves in their Relation to Physiology and Pathology." By Henry Frazer Campbell, A.M., M.D. Philadelphia: J. B. Lippencott and Co. 1857, p. 98.

medical and surgical advice; but it had been utterly unavailing. . . . Nov. 23rd, 1818.—She consulted me with a view to obtain relief from the toothache. . . . Having been previously apprised of the nature of her malady, I had already begun to suspect it was owing to diseases of her teeth. . . . This opinion seemed confirmed by observing that there was no visible defect in the organisation of the ears. . . . Her teeth were generally under the influence of caries, and the disease had penetrated to the cavity of some of them. . . . There was but little room for the dentes sapientiæ . . . and I readily suspected that their precocious formation, and the want of room for them to pass through the gums, in combination with the diseases of the teeth, were the causes of the inflammation, and the pain in the ears." Dr. Koecker extracted six molars, removed the tartar adhering to several teeth, and in the course of the following six months, stopped several other teeth with gold. The patient's "hearing began to improve, and the pains to subside, in a few days after the extraction of the teeth;" and, by Dec. 24th, "the patient was in excellent health and spirits, suffered no pain; the discharge from the ears had subsided, and the hearing was much improved." In the spring of 1819, when she caught a violent cold, there was a recurrence of the inflammation of the ears, with a slight discharge and increase of deafness; but these symptoms soon again subsided, and up to 1822, when Dr. Koecker saw her last, she continued well. Parsons, in his "Prize Essay on Neuralgia," quoted by Brown-Séquard, mentions two cases in which a carious tooth produced neuralgia in the arm.

Gastric disorders, consequent on dental irritation, occur not infrequently in adults, as well as in children; to what extent the chronic constipation, so common in adults, is due to the same cause, it is impossible to say, but that in a certain proportion it is so I have no doubt. And though diarrhœa, originated by excitement of the dental nerve, is mainly incidental to childhood, it may often be observed if looked for as an accompaniment of the evolution of the wisdom teeth.

The eminent physician, Dr. Rush, who practised in Philadelphia during the latter part of the last, and the early part of the present, century, quotes, in his "Medical Inquiries," Vol. I., p. 199, an account by Dr. Siebold, "of a young woman who had been affected for several months with great inflammation, pain, and ulcers in her right upper and lower jaws at the usual time of the appearance of the catamenia, which at that period were always deficient in quantity. Upon inspecting the seats of those morbid affections, the Doctor discovered several of the molars in both jaws to be decayed. He directed them to be drawn, in consequence of which the woman was relieved of the monthly disease

in her mouth, and afterwards had a regular discharge of the catamenia."

Dr. Rush also says,—"Some time in the month of October, 1801, I attended Miss O'C. with a rheumatism in her hip-joint, which yielded for a while to the several remedies for that disease. In the month of November it returned with great violence, accompanied with a severe toothache. Suspecting the rheumatic affection which was excited by the pain in her tooth, I directed it to be extracted. The rheumatism immediately left her hip, and she recovered in a few days : she has continued ever since to be free from it."

The same author mentions a case of epilepsy in a young man, whom he cured by prescribing the extraction of several diseased teeth ; and bearing in mind the agency of "malaria," or rather of that pathological condition said to be the product of "malaria" in originating neuralgia, we may discern a peculiar significance in the following passage—also from Dr. Rush's "Medical Inquiries" : —"Dr. Gater relates that M. Petit, a celebrated French surgeon, had often cured intermittent fevers, which had resisted the bark for months, and even years, by this prescription" (the extraction of diseased teeth).

Exostoses at the roots of teeth, as in the case recorded by Sir Henry Halford, and hypertrophy of the roots occasionally originate neuralgia ; but these states are generally consequences as well as causes of the disease. The irritation arising from a carious tooth may be reflected directly on itself through its nutritive nerve, which being abnormally excited, may produce a general enlargement of the root, or a local development of bone-tissue (exostosis). In either case there may be consequent pressure on the sensory nerve, resulting in such irritation of it as to generate very severe toothache, or facial neuralgia, which may long persist after the exciting cause has been removed. "Of the various dental maladies, exostosis," says Mr. Tomes, "is the most frequent source of sympathetic disorders," consisting of "functional derangement of the whole nervous system, or the nerves of some particular part." In these cases "pain in the affected teeth, so far as my experience goes," he adds, "is very commonly absent."*

Abscesses at the roots of teeth are especially frequent causes of intensely painful excitement of the trifacial nerve ; and they, like the exostoses and hypertrophy just mentioned, may also be regarded as, in most cases, both causes and consequences of nervous irritation. It must, however, be borne in mind that, though in the majority of cases when any one of these morbid conditions occurs it is a

* "Lectures on Dental Physiology and Surgery." London : 1848. P. 241.

result of reflex action induced by caries of the particular tooth at the root of which the hypertrophy, exostosis, or abscess exists, it may also originate in some other tooth, the disease of which is reflected away from itself in the form of one of the morbid phenomena in question.

Injury to the dental nerve, by the act of extracting a tooth, is said by Valleix to have induced severe facial neuralgia. "The first symptoms began," he says, "in a patient who had never before experienced neuralgia, a quarter of an hour after the extraction of a canine tooth, the seat of a simple toothache."* It is doubtful, however, whether in this case the tooth in question was not carious (the fact is not stated), and whether the irritating action of the caries did not produce, at the root of the fifth nerve, a morbid excitement which continued, though it may have been intensified by the extraction, long after the cause of irritation was removed.

Lateral pressure of teeth against each other when the jaws are insufficiently developed to allow of their free expansion may also produce irritation capable of generating neuralgia. Owing to the constant and increasingly operative influence in civilized life of certain tendencies which counteract the full development of the jaws, the evils incident to lateral pressure of the teeth are likely to become increasingly frequent. "It appears," says Mr. Darwin, "as if the posterior molar, or, wisdom, teeth, were tending to become rudimentary in the more civilised races of man. These teeth are rather smaller than the other molars, as is likewise the case with the corresponding teeth in the chimpanzee and orang; and they have only two separate fangs. They do not cut through the gums till about the seventeenth year, and I am assured by dentists that they are much more liable to decay, and are earlier lost, than the other teeth. It is also remarkable that they are much more liable to vary, both in structure and in the period of their development, than the other teeth. In the Melanian races, on the other hand, the wisdom teeth are usually furnished with three separate fangs, and are generally sound. They also differ from the other molars in size, less than in the Caucasian races. Professor Schaffhausen accounts for this difference between the races by the 'posterior portion of the jaw being always shortened' in those that are civilized, and this shortening may, I presume, be safely attributed to civilized men habitually feeding on soft, cooked food, and thus using the jaws less. I am informed by Mr. Brace that it is becoming quite a common practice in the United States to remove some of the molar teeth of children, as the jaw does

* "Traité des Névralgies." P. 145.

not grow large enough for the perfect development of the normal number."*

Concealed stumps sometimes cause terrible suffering. "Small fragments of the fangs of the teeth are," as remarked by Dr. Hunt, "often broken in the operation of extraction, and left in the jaw, and subsequently prove a cause of irritation to the nerve; from the gum closing over them, they frequently elude detection." Sometimes, too, teeth are broken off level with the gum by accidental violence, and their roots, which are apt to be inflamed in consequence of the concussion, occasionally become the hidden source of fearful torment. Mr. Charles Rahn related to me recently, an instructive case of this kind. A young lady, by falling from her horse, had four of her teeth broken. One of these was the wisdom tooth on the left side. The crown of it was broken off below the level of the gum. The root, the existence of which was not even suspected by the dentist to whom she was first taken, remained in the gum between two and three years. Soon after the accident, intense facial neuralgia came on and tormented the patient almost incessantly, and all the usual remedies were tried in vain. At length Mr. Rahn, who was consulted, discovered by means of a probe, the invisible cause of all her suffering: it was the root just mentioned which had become enormously hypertrophied, and had assumed a bulbous shape, the neck of the bulb being tightly surrounded by the alveolus. The difficulty of removing this cause of irritation was, of course, great; but from the time of its extraction, the facial neuralgia gradually lessened, and, before long, completely ceased. Dr. Koecker relates the following case:—Mrs. K., æt. twenty-eight, suffered for a considerable time "great pain in the whole (under) jaw and mouth, extending as far as the ear," and she had an abscess under the chin, on the left side. "These symptoms at last became so violent as to produce general disorder and fever. Three large grinders, on the side affected, had been so completely carried away by decay that the parts of the roots remaining were entirely covered by the gums, which were greatly inflamed. These roots, six in number, were extracted; and so effectual was the relief obtained from this operation, that in a very short time the patient perfectly recovered. Eleven days afterwards, some chronic pain was experienced in the opposite side of the jaw, and on examination the chin was found indurated and swelled in some degree, and the points of two roots of the second large grinder being completely covered by the gums, and hidden behind the

* "The Descent of Man, and Selection in Relation to Sex." By Charles Darwin, M.A., F.R.S., &c. London. 1871. Vol. I. Pp. 26, 27.

first large grinder, were detected with great difficulty by the probe." These roots were removed, and "the parts were restored to complete health in a short time."

As dental causes of neuralgia the wisdom teeth are, probably, the most potent, and the least frequently discovered. Reasons are given above why these teeth are often especial sources of irritation, and why the seat of it remains, in a large proportion of cases, long undiscovered, and often undiscoverable. There is, however, another and still stronger reason why these teeth are prolific causes of great suffering, viz., their remarkable tendency to abnormal development. The various abnormal directions in which they are prone to grow are concisely indicated by Mr. Tomes. He says,—"The wisdom teeth of the upper jaw, when taking a false direction, give rise to great inconvenience, but the more distressing symptoms are generally connected with the malposition of those in the inferior maxilla. In these cases we find the disorders similar, but more severe, and better marked than when arising from ill-placed wisdom teeth of the upper jaw. The third molar may be malplaced in five different directions. First, it may grow obliquely forward, with the masticating surface directed against the posterior surface of the second molar. Second, the crown may be directed outwards, towards the cheek, and may even be imbedded in the cheek. Third, it may take an inward direction towards the tongue. Fourth, the tooth may be directed upwards in the coronoid process, either completely or partially within the bone. Fifth, it may occupy its natural position in the jaw, but be held down by indurated gum."* Mr. Tomes has quoted from one of Velpeau's clinical lectures seven remarkable cases of extraordinary suffering, produced by the abnormal or impeded development of the wisdom teeth. In one case, reported to Velpeau by Esquirol, an insane person was restored to reason "by a crucial division of the gum, which liberated the wise tooth." It is obvious that if that terrific revolution in the nervous system—insanity—may be induced by the cause in question, the incomparably lesser evil—mere physical pain—however great, must be easily producible by the same cause. The following case, one of the seven given by Velpeau, is an instructive one of this kind:—"A lady, at the age of twenty-two, began to feel a dull pain at the angle of the lower jaw on the left side of the face; the pain soon extended to the adjoining teeth, but was distinct from toothache. As the pain continued to increase in intensity for several months, it was thought to be a case of rheumatism, and as such was treated, but

* "Lectures on Dental Physiology and Surgery." London: 1848. Pp. 173-4.

without good effect; then blisters, and a seton at the back of the neck, kept open for a month, were tried, and opiates were given, but all to no purpose. She went and resided at a watering-place for sometime, but came back to Paris nothing benefited. At this time the teeth were all good in appearance, the gums healthy, and nothing denoted the eruption of a wise tooth. However, upon making a section into the gum over the wise tooth, a probe passed down led to the discovery that the wise tooth was arrested in its progress by the direction it had taken—directly forwards, its crown coming in contact with the posterior surface of the second molar. The second molar was extracted, and the patient immediately relieved from her suffering."*

Facts of the kind mentioned in this section, and hundreds of them could be adduced, show how indispensably necessary it is in all cases of neuralgia to make a searching examination of the teeth, in order to discover whether the source of the malady may not consist in some one or more of the several disorders to which they are liable.

Indigestion frequently induces an attack of neuralgia, in those persons in whom its predisposing causes are already operative. In numerous cases I have seen evidence of the potency and frequent operation of this cause, and records of its activity abound in treatises on neuralgia. Abernethy remarks,—"That local nervous pains may depend on general nervous disorders seems to me very probable; at least, I can take on me to affirm that I have known nervous pains cured by correcting the disorder which, in these cases, existed in the digestive organs. In the cases, also, of tic douloureux, which have fallen under my observation, there has been great disorder of the digestive organs; and I have known cases resembling those of tic douloureux cured by correcting the unhealthy state of those organs."† The two cases related by Sir B. Brodie, and already mentioned at p. 16 of this volume, in which pain in the foot was produced by temporary disorder of the stomach, confirm in a striking manner Dr. Abernethy's opinion.

Mr. Hilton justly observes that "sympathetic pains on the surface of the body, connected with derangements of the internal viscera, are of great and pressing interest to us," and though I may not quite concur in his teleological views concerning those pains, I fully agree with him in appreciating them as invaluable indications of "the pathological state of internal viscera or internal parts of the body." The following

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* "Lectures on Dental Physiology and Surgery." London: 1848. Pp. 175-6.

† "Surgical Observations," p. 95. cited by Dr. Downing.

lucid paragraph clearly indicates the paths by which gastric, as well as other disorders of the abdominal viscera operate as causes of neuralgia. "Perhaps one of the most frequent of the so-called sympathetic pains experienced is that which occurs between the shoulders, or over the inferior angles of the scapulæ. The pain must be connected with the distribution of some of the spinal nerves, because no other structures could express the pain, and no other nerves occupy that position, except the fourth, fifth, and sixth dorsal nerves, which are distributed over the inferior angles of the scapulæ and interscapular space. Hence, we must conclude that these nerves are the immediate seat of the pain. If we trace internally the great splanchnic nerve from within the thorax downwards, and find it connected at its abdominal end with the solar plexus, thence trace its distribution to the stomach, duodenum, liver, and pancreas; and if we follow the other or upper end of the same great splanchnic upwards to the fourth, fifth, and sixth dorsal nerves, which give peripheral sensitive filaments to the integuments, over the angles of the scapulæ, to the interscapular spaces and the adjoining skin, one can imagine that these nerves, carrying the influence upwards and backwards, may explain the occurrence of the pains sometimes experienced in those external parts associated with abdominal visceral disturbance. I think it likely, then, that the pain which persons experience in disease of those viscera may be explained by the relative position of the great splanchnic nerve, communicating, on the one hand, with the solar plexus, and thence with the digestive organs; and, on the other, distributing its branches to the fourth, fifth, and sixth dorsal nerves."*

Disorders of the Bowels are especially frequent excitants of neuralgia in various parts of the body, and are almost sure to bring on an attack in any particular part which is the usual seat of pain in persons who are accustomed to suffer from the disease. While writing this paragraph, I have under my care three patients, each of whom exemplifies the statement just made: one of them —a lady—knows when there is defective action of her small intestines, for, when such is the case, she has what she describes as "a sort of gnawing pain along the arm in the marrow, or as if it were inside the bone," and "a feeling as if the arm were paralysed at the same time." She knows the large intestine is not at fault, for enemata do not relieve her; but as soon as by the action of a purgative, consisting of compound colocynth pill, combined with a little calomel and hyoscyamus, which I advised her to

† "On the Influence of Mechanical and Physiological Rest in the Treatment of Accidents and Surgical Diseases, and the diagnostic Value of Pain." By John Hilton, F.R.S., F.R.C.S. London: 1863, p. 75.

make use of, the contents of the small intestines are cleared out, the pain in the arm invariably subsides. Another lady —many years a victim to neuralgia—often traced the origin of an attack to constipation during two or three preceding days, and often when the paroxysms were more than ordinarily severe, she was in the habit of ascribing their extraordinary severity to the same cause ; certainly, I am of opinion that my persistent efforts, during several months, to ensure the action of the bowels daily, contributed considerably to the success of my treatment in this case. The third case to which I refer proves not less indubitably than the two already mentioned that defective action of the bowels favours the production of neuralgic pain, and when present, both prolongs, and intensifies it ; but, unfortunately, this case also exemplifies another distressing difficulty, only too often met with in sufferers from what are commonly recognised as disorders of the nervous system : when the bowels have been fairly opened by purgative medicine, however gently operative, the nervous system suffers so much from the irritant action of the medicine necessary to make the bowels function at all, that the distress thus occasioned seems to go far towards neutralising the advantage obtained by their action. In fact, it may be safely asserted that, as a general rule, when chronic disorder of the bowels, usually in the form of obstinate constipation, is added to the troubles of neuralgic patients, the two co-existing maladies are twin products of a common cause, operative in the nervous centres functionally related to the morbidly affected parts. Nevertheless, it must always be borne in mind that the contents of the bowels, if retained an abnormally long time, and especially if concreted into hard masses, react on the nervous centres, which caused the retention in the first instance, and hence act as secondary causes, by which the original evil is augmented and intensified. It is most generally, I apprehend, as secondary agents in the manner explained, that bowel-disorders become exciting causes of neuralgia, and, if so, it is easily conceivable what is the measure of truth in Sir Charles Bell's theory "that the source of the disease is in the abdominal viscera—not arising from disease otherwise formidable, but rather from disordered functions,"* and how it came to pass that his prescription of croton oil proved so far successful as to encourage in him the belief that he had discovered both the cause and cure of the malady—a belief which, unhappily, I need scarcely say, his subsequent experience greatly modified. As remarkable illustrations of reflex action from the bowels producing neuralgic pain, I may mention the three following cases :—Mr. Joseph Swan knew a gentleman in whom pains

* "The Nervous System of the Human Body." Third edition, p. 359.

of the fingers were always excited by the act of defecation; a gentleman, under the care of Dr. Downing, had pain in the hips and legs in consequence of the same act; and one of my patients —a lady—informed me that almost invariably it caused a sudden and severe pain along the back of her neck.

Hemorrhoids.—Dr. Copland has met with several instances in which "internal hemorrhoids have been attended by severe neuralgia of the lower extremities, and as soon as these have been removed, this affection has ceased."* Dr. Hunt reports a case of this kind.† He also records a remarkable case in which "intense pain in the nerves of the cheek was produced immediately on trying a pile," and "continued until the ligature was removed, when it instantly ceased."‡

Intestinal Worms sometimes give rise, it is said, to neuralgic pains, which generally cease immediately after their expulsion.§ A case of this kind is given by Dr. Anstie.‖ I must add, however, that though I have had a large experience in the treatment of patients troubled with worms, I do not recollect a single case in which I have found them to have brought on neuralgia.

Menstrual Disorders.—Hunt has devoted a chapter to "Tic Douloureux arising from Disorders of the Uterus," and gives several instructive cases. He mentions one woman, in whom, "about a month after her confinement, a very profuse sanguineous discharge occurred from the uterus, and she *then*, for the first time, perceived an uneasiness in the nerves of the cheek, which soon increased to decided pain. Within a month this pain had all the characteristics and severity of tic douloureux. . . . . The pain returned at every successive [menstrual] period for several months." He reports another case, in which a woman who was attacked by facial neuralgia, a few months after her confinement, invariably suffered a prolonged paroxysm of the disorder at the beginning of each of her menstrual periods; and, referring to another case of the same disease, he says, it was "most severe" during the menstrual period, "particularly at night." Dr. Hunt thinks these cases "go very far to prove the connection between the neuralgic pains in the cheek with a morbid condition of the uterus, that condition being one of weakness, irritability, and accompanied by discharges." That

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* "Dictionary of Practical Medicine." Vol. II., p. 836.

† "On the Nature and Treatment of Tic Douloureux, &c." P. 146.

‡ *Ibid*, p. 121.

§ "Neuralgia: its various Forms, Pathology, and Treatment." By C. T. Downing, M.D. 1841, p. 44.

‖ "Neuralgia and the Diseases which Resemble it." P. 50.

the "connection" alleged actually existed there can be no doubt, but that that connection was a causative one, in the sense implied by Dr. Hunt, I do not believe. I hold that the morbid condition of the womb in these cases was itself one of several expressions of primary disorder of the nervous system, and that, reacting on that system that condition then became the exciting cause of the neuralgias in question. That this is really the nature of the causative relation between the uterine disorder and the facial neuralgia in these cases is proved, as it seems to me, by the results of my treatment of similar cases by means of the Spinal Ice-bag. In several cases of this kind, the sedative influence of ice along the lower half of the spine has remedied completely both the uterine and the neuralgic disorders at the same time.

Suppression of the menses apparently induces neuralgia in various regions—most frequently below the left mamma, but sometimes along branches of the fifth nerve. In these cases also the suppression is, I apprehend, a secondary disorder, and, as in the cases just mentioned, operates causatively on the neuralgia as a reactionary agent. While writing this section, I have under my care a lady who has been suffering about twelve years from exceedingly severe neuralgia, ranging over almost every part of the body, and which seemingly originated simultaneously with the suppression of the menses, which during all that period never recurred. But on carefully tracing the history of the case, I find that distinct neuralgic symptoms were experienced for some time before the date of the suppression, which, however, undoubtedly intensified and thoroughly established the neuralgic disease.

The natural decline of menstruation is notably associated with the production of neuralgic disorders, as it is with the production of many other maladies of the nervous system. I know of no organic process more fruitful of neuralgia than this, and none the associated evils of which are less under remedial control by means of medicines.

Pregnancy induces especially great disturbances of the nervous system: how great these often are may be inferred from the obstinate sickness and fainting fits which often accompany that state. Exciting impressions are being continuously transmitted from the womb to the nervous centres, which result in pain referred now to one part of the body, now to another; in fact, few experiences of these reflex phenomena, originating in the gravid uterus, are more common than that of dental neuralgia, which is occasionally associated with such disorder of the nutritive processes, that previously healthy teeth become softened in their texture and loosened in their sockets, and sometimes fall out.

Dr. Hunt mentions a lady who suffered intensely from neuralgia at the beginning of six different pregnancies. "She was seized with violent pain in the right temple and side of the face, quite in the commencement, for she had only passed a week beyond the usual time of menstruation. At the expiration of ten days, the pain assumed the character of intermittent headache. She had no return of the malady until about the same period at the next and all her subsequent pregnancies. . . . . Two other ladies, sisters, who suffered pain in their cheeks in the commencement of their pregnancies, also suffered occasionally during nursing; at these times, however, they remarked that the pain was always preceded by slight sanguineous discharge from the uterus."

The following case, communicated to Dr. Hunt, and published by him, is strikingly illustrative of the reflex actions, originated in the womb, and manifested in different branches of the fifth nerve. "Mrs. G———, the mother of two children, when about seven months advanced in pregnancy, was seized with pain in a tooth." The pain "regularly returned during the day and night in paroxysms of an hour's duration, with an interval in each of two hours. The pain extended to the superior maxillary nerve and supra-orbital, and was more of the character of tic douloureux than toothache." During the second night, "when she was awoke by the pain in the cheek, she discovered that the liquor amnii was escaping. From that time she remained free from the neuralgic pain," until the next night, when the action of the womb being sluggish, it was increased by a dose of ergot, and the patient was presently delivered. "During the continuance of the labour, the neuralgic pain in the cheek was very violent, but subsided as soon as the child was born. The placenta was retained for a considerable time, and, while the uterus was in a quiescent state, the cheek was free from pain; but on attempting to remove the placenta, as soon as the fingers reached the uterus, the neuralgic pain returned violently, and continued during the examination and process of extraction, but ceased immediately the removal of the placenta was effected, and has never since returned." A scarcely less interesting case is also reported by Dr. Hunt, of a lady who suffered severe pain along the ulnar nerve. The pain "came on when she was about four months advanced in pregnancy, and continued until her confinement, after which it immediately ceased."

Uterine Displacements of various kinds, but especially retroflexions and retroversions, are prolific sources of disease of the nervous system, and often operate as exciting causes of neuralgia. In one case of the most violent sciatica I ever witnessed, the pain was directly referable to retroversion of the womb. It was not per-

manently retroverted, but occasionally it rose up, and regained its normal position. The act of retroversion was most prone to recur under the influence of strong mental emotion, especially of a depressing kind; and sometimes the patient was made aware of the change by the sudden supervention of the most excruciating pain in the hip and thigh, accompanied with a considerable amount of temporary paralysis of the affected limb.

Sexual Intemperance, as an exciting cause of neuralgia, I believe to be of very frequent occurrence in both sexes; and this opinion is also held by Dr. Anstie, who, referring to a variety of sciatica, the sufferers from which are chiefly women, expresses the suspicion that it "not unfrequently depends on, or is much aggravated by, an excited condition of the sexual apparatus." * It is of course difficult, if not impossible, to justify this belief by the citation of authentic cases; for few persons in whom this cause thus operates, and who are conscious that it does so, are sufficiently truthful or explicit to admit the fact; and there are probably many cases in which, though the disease is really due to this cause, the patient has no suspicion that such is the fact. Neuralgia arising in this way manifests itself principally, no doubt, in the pelvic region and lower extremities. I am disposed to believe that uterine pains experienced during the menstrual intervals, and their very frequent attendant, leucorrhœa, are often thus engendered; and, in fact, I think it very likely that, in a considerable proportion of cases in which married women suffer very severe backache and uterine pain during their catamenial periods, they do so because, reckless of their general health, as well as of that of their reproductive system, their husbands induce them to minister to the gratification of a passion which in many cases knows no restraint but exhaustion.

Masturbation is probably a more frequent and a more potent cause of neuralgia than the one last named. I am acquainted with cases of both sexes in which the disorder was clearly traceable to this cause, and I am constrained to believe that a considerable proportion of the large number of unmarried women who suffer from painful menstruation and dysmenorrhœa contribute to induce their sufferings by self-excitement. Dr. Anstie remarks that he has observed the kind of sciatica previously mentioned "with marked frequency in women who remain single long after the marriageable age." He adds,—"in the case of several male patients there has been either the certainty or strong suspicion of venereal excess." †

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* Art. in "A System of Medicine." Edited by J. Russell Reynolds, M.D. Vol. II., p. 733.

† *Ibid.*

Muscular Movements, in some cases, speedily bring on an attack. One of my patients was almost debarred, during many months, from playing the piano by the acute pain which playing for even a very short time brought on in both arms; and for the same reason, another patient, though very fond of the piano, was obliged to abandon it altogether during several years. Walking has often brought on an attack of sciatica. I have now a patient in whom long standing will induce it; and in a case of brachial neuralgia, the patient, a laundress, has been obliged to discontinue her work, because any considerable use of her arms produced a terrible paroxysm. Dr. Anstie mentions similar cases. He says,—"In the neuralgias of the arm we begin to recognise the etiological characteristic which distinguishes most of the neuralgic affections of limbs, namely, the frequency with which they are aggravated, and especially with which they are kept up and revived, when apparently dying out, by *muscular movements*." He then refers to a case "of neuralgia of the sub-scapular, musculo-spiral (cutaneous branches), and radial," in which "the act of playing on the piano, for half-an-hour immediately revived the pains in full force, when convalescence had apparently been almost established." *

Concussion and Shock leave on the nervous system, in many cases, permanent effects which manifest themselves in various form of nervous disorder, neuralgia being one of them. Sir Charles Bell gives the following case, in which there was both laceration and concussion; but it is probable that the latter was the cause of the recurrent suffering described. "A gentleman returning from hunting was thrown; he lacerated his scalp, and suffered concussion. He lost a great quantity of blood, was reduced very low, and remained subject to an affection of his head, which, years after, has returned at intervals. It will come on in consequence of the conversation, heat, and light of a dinner party, even although he does not exceed; and on other occasions any direct disturbance of the stomach will produce it. He has headache and pain along the course of the nerves on one side of the head, a tenderness and indescribable sensation on the scalp, a puffing of all that side of the face, and swelling of the eyelids of the same side. This after a day or two, by rest and evacuations, subsides. Still he becomes liable to it on any excitement of the mind, or derangement of the digestive organs."† Sir Charles mentions another interesting case of the same kind. He was consulted by

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* Art. in "A System of Medicine." Edited by J. Russell Reynolds, M.D. Vol. II., p. 729.

† "The Nervous System of the Human Body." P. 336.

a patient who suffered from violent attacks of pain in the left temple. They came on in the morning, and especially if he had been lying on his back; after continuing an hour they became worse, and at midday raged terribly. During each attack the pain recurred every two or three minutes, extended from the temple to the region of the heart, where he felt as if there were an enlargement, and was attended with faintness and sinking. He ascribed his suffering to an accident fifteen years before, when a statue fell on him and stunned him.*

Alcoholic Drinks may, as a general rule, be regarded rather as predisposing than as exciting causes of neuralgia; but I mention them here because I have seen cases in which they certainly acted as exciting causes on several occasions; and, indeed, there is a *prima facie* probability that in persons predisposed to suffer from neuralgia, the stimulus of alcohol, in a certain proportion of cases, brings on an attack. When the disease is already established, its paroxysms are quickly induced, in a considerable proportion of cases, by even the most moderate indulgence in any kind of alcoholic liquors. Speaking of the pain of one of his neuralgic patients, Sir Charles Bell says,—"Wine will bring it on, and indeed taking his tincture will cause it."†

Cold and Heat—The influence of cold in inducing neuralgia is well known, and is recognised by every one who suffers from it. In a case of facial neuralgia, generally recurring from one till five each afternoon, described by Sir Charles Bell, the patient, a lady, thought her complaint commenced from cold, caught in driving in an open carriage.‡ When the neuralgic habit is once established, the pain is inducible with wonderful facility by a multitude of influences which may thus become exciting, or, as Valleix designates them "occasional" causes of the malady. I do not call to mind one case of neuralgia in my own practice in which cold was alleged to be the primary or original cause of the disease, but I am acquainted with numerous cases in which special and very severe attacks were brought on by cold in persons who had previously suffered from the malady. Valleix, in his chapter entitled *Névralgie en Général*, gives a table of "*causes occasionelles*" from which it appears that in seventeen cases out of sixty-seven the disease came on "*après un refroidissement plus ou moins prolongé.*"§ He does not say distinctly that in these seventeen cases the neuralgia came on for the first time after *un refroidissement*, but this, I apprehend is his meaning, and I can readily imagine such to have been the

* "The Nervous System of the Human Body." P. 361.
† *Ibid*, p. 364.
‡ *Ibid*, p. 358.
§ "Traité de Névralgie." P. 697.

case, for I believe that that peculiar condition of the nervous system, induced by alternations of temperature and expressing itself by those phenomena which, collectively, we designate "a cold" is peculiarly favourable for the genesis of neuralgic pain. I must add, however, that in my opinion high as well as low temperatures are capable of inducing that condition, and that its efficient cause consists less in the intensity of cold or heat than in the sudden alternations of them to which the patient is exposed. As remarked by Dr. Downing, "the influence of temperature on the nerves is well exemplified in the dental branches. When the parts are predisposed, an attack of toothache may be instantly brought on by taking anything, either too hot or too cold into the mouth." After mentioning a case in which "it was quite clear that the complaint (facial neuralgia) originated in exposure to cold rain, snow, and wind, while hunting," he says, "It is more difficult to trace the origin of the disease to excess of temperature—to exposure to great heat; yet I have been able to do so in more than one instance. A young clergyman, I remember, had paroxysms of neuralgia in the second division of the fifth nerve for two years and a half. It originated in a bad habit he acquired at college of reading by the light of the fire for an hour or two every evening during the winter months. As he sat in one position, and held his book quite close to the bars, not only did the right side of the face become neuralgic, but the sight of the eye was nearly lost. In the cases of Vasper and Pullen (cases detailed by Dr. Downing), the disease arose, undoubtedly, from exposure to the heat of a fire. They were both cooks, and in the course of their vocation were necessarily exposed to intense heat. Pullen has told me that, when preparing for a large dinner party, she has often been obliged to stand over the flames until her head has been nearly roasted."*

Atmospheric Electricity occupies a place in the most potent group of agents capable of bringing on attacks of neuralgia in persons already subject to the disease; and several cases in which it has acted as a primary exciting cause are on record,† but I know of no case in which neuralgic pain thus excited has proved of long continuance. Within the wide range of pathology few facts are more striking and remarkable than those illustrative of the in-

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* "Neuralgia: its Various Forms, Pathology, and Treatment." Pp. 50-1-2.

† See the Section entitled "Effets de la Foudre sur le Système Nerveux," in vol. II., p. 90, et seq, of the elaborate work of Dr. F. Sestier, "De la Foudre de ses Formes et de ses Effets sur l'Homme les Animaux, les Végétaux et les Corps Bruts des Moyens de s'en preserver et des Paratonnerres. 2 vols., 8vo. Paris: 1863.

fluence of electric disturbances in the atmosphere on the nervous system of man. In my work on "Diarrhœa and Cholera,"* I have adduced several instances in which those disorders have been the immediate result of the disturbances in question, and every physician is aware how astonishingly liable are so-called "nervous" patients to have their peculiar disorders intensified, or to have fresh attacks of them developed when there is "thunder in the air;" and of all patients of this class the neuralgic are pre-eminently liable to have their sufferings renewed or augmented at such times.

Psychical Influences.—Still more subtle and mysterious even, and much more frequently operative than the agent just mentioned as an exciting cause of neuralgia, is mental emotion, and especially when the disturbance is of a distressing kind. Though I cannot adduce any case in which any well-defined and persistent neuralgia has been originated by the operation of psychical influences, I am disposed to believe that in a considerable proportion of those cases in which no assignable cause is seemingly discoverable, the real cause is psychical; and it is notorious that neuralgic as well as epileptic paroxysms are, in a vast number of cases, very often induced by mental disturbances in the form of vexation, irritation, or emotional depression; and in some cases even joyous excitement, when excessive, will act in the same way. Moreover, a special and energetic concentration of thought on any particular part of the body is capable, in some cases, of exciting in it not only pain, but even symptoms of inflammation. "The physiological effects of undue 'attention' serve to explain many curious phenomena exhibited in certain disturbed conditions of the nerve-centres, which may be induced artificially, as in hypnotism, or arise from less obvious internal causes, as in hypochondriasis. . . . A woman is brought into close relation with some one suffering from cancer of the breast; the attention is directed involuntarily to the corresponding organ in herself; the part becomes painful, swelling even occurs, and what is termed neuralgia of the breast is set up. A case is related of a gentleman who lost an intimate friend from cancer of the œsophagus, the sufferings which he witnessed made a strong impression on his mind; he began himself to experience difficulty of swallowing, and ultimately died from the effects of spasmodic dysphagia.

"In hysteria [?], when the attention has been fixed on an articulation from mental or emotional causes, or in consequence of some slight injury, symptoms which might be supposed to indicate structural disease of the joint are apt to show themselves.

* See Section 4, entitled "Atmospheric Electricity," of the chapter on "Causes of Cholera." P. 146, et seq.

There is great *pain*, pain out of proportion to the other symptoms, and frequently extending over a large surface, but often suspended if the attention is diverted, and completely absent during sleep, which may be prolonged and sound. . . . There is sometimes a slight amount of *swelling*, which is diffused in the external areolar tissue, and arises from a turgid condition of the small vessels, or from increased effusion into the areolar interspaces. On handling the part *fine crepitation* is often felt, evidently situated near the surface, and differing essentially from the grating or crackling which may be attendant on removal of the cartilages. Frequently *convulsive* or *spasmodic action* of the muscles is induced by any attempt to bend or straighten the joint; or sometimes there is a more permanent *rigidity* by which the limb is fixed in some improper position. When volition is suspended, however, the rigidity and the spasm are suspended likewise. General symptoms indicating hysteria [?] are often present; in many cases there is habitual coldness of the extremities, with other evidence of weak circulation; but articular neuralgia is sometimes seen in stout and florid girls. Some irregularity of the menstrual functions is usually present."* As directly bearing on this subject, the facts described at page 35 are especially instructive.

Compression of Nerves, which occurs in various ways, is a well-known cause of neuralgia, and very often the pain thus produced is not only extraordinarily severe, but recurs in terrific paroxysms with intervals of ease, although the cause is continuously present. Moreover, in some cases, examples of which will be hereafter given the paroxysms are strictly periodical. Of the different agents by which compression is effected, the most commonly operative are fœcal distension of the rectum, and of the sigmoid flexure of the colon; hœmorrhoids; retroversion and retroflexion of the uterus; herniæ; enlarged glands or bursæ; abscesses; cancerous growths; and tumours of various kinds. Sir B. Brodie, cited by Dr. Lockart Clarke,† "mentions the case of a gentleman who suffered severe and increasing pain in the left leg, from the foot to the knee, in the course of the peroneal nerve. As the limb presented no morbid appearance, the disease went by the name of neuralgia. After a considerable time the patient died of dropsy, and on opening the abdomen, a large solid tumour was found attached to the left side of the lumbar vertebræ. It was evident

* "Holme's System of Surgery." Second Edition. Vol. IV. Pp. 73-4. Art. on "Diseases of the Joints." By Athol A. Johnson.

† "Nerve-lesions and their more Immediate Effects." Art. in Holmes' "System of Surgery," Second Edition, Vol. iv., p. 160.

that this tumour must have pressed on the origin of the sciatic nerve." As several of the agents just named, by which nerves are liable to be compressed, occasionally play important parts as originators of neuralgia, the following authentic cases exemplifying their action, are especially interesting and instructive :—

Aneurismal tumours.—In many patients suffering from aneurism, the disease first announces itself by neuralgic pain sometimes exceedingly severe, and often as thoroughly paroxysmal and periodic as if it had been produced by malaria. Thoracic neuralgia, especially angina pectoris, has in many cases been found due to aneurism within the thorax. Trousseau in his lecture on angina pectoris, mentions three cases of this kind. In the first "acute pain behind the sternum, radiating to the left shoulder and arm" was referable to an aneurism of the arch of the aorta. The second was a case which he attended "for several years," and the nature of which he "did not for along time recognise :" the patient "complained of a violent pain about the base of the chest, in the course of the intercostal nerves ; the pain was most intense in front, and when it was so, the skin was also slightly benumbed. It sometimes left the chest, and spread to the side of the neck and head, when it simulated a neuralgia. The symptoms were not constant, but returned at uncertain intervals. All the medical men whom the patient consulted, and I among the rest," says Trousseau, "thought that the case was one of rheumatic neuralgia." At last, after the lapse of several years, "he complained one day of a queer throbbing sensation in the back, on a level with the seventh and eighth ribs on the left side," and then for the first time were discovered indubitable symptoms of aneurism of the aorta, which of course proved fatal. In the third case paroxysmal pain "in the base of the chest following the intercostal nerves," and lasting several years was ultimately found to have been produced by aneurism of the thoracic aorta. And the case already quoted from Romberg, in which aneurism of the carotid artery within the left cavernous sinus operated as the cause of the most horrible facial neuralgia during the long period of twenty-six years is an especially remarkable example of the production of neuralgia by an aneurismal tumour. Nerves not infrequently ulcerate in consequence of the pressure of aneurismal as well as of other tumours, the ulceration giving rise to excruciating pain. In the case last mentioned the trigeminus of the left side is said to have been "only half the ordinary thickness, slightly reddened, presenting one spot of a dark red ; no filamentous structure was to be found in it, the nerve being almost reduced to pulp. The smaller division of the nerve, which was also softened and attenuated, was only to be distinguished at the inner side of the

nerve, at a distance of six lines from the pons."* And Dr. Clarke cites from Morgagni "a striking case of ulceration of the sciatic nerve, produced by pressure of an aneurism which extended backwards from the right groin."

Cancerous growths.—The following remarkable case of this kind is recorded by the late Dr. Bright :† "Mary Grossmith, aged forty, was admitted, under my care, into Guy's Hospital, in August, 1827. She was thin, and her countenance was strongly marked by the effects of long-suffering. Her most prominent symptom was extremely acute pain on the left side of her face, which was seldom completely removed, but became more severe in paroxysms. It was regarded as tic-douloureux by all who had seen her, and resisted all the means employed for her relief. Within about a fortnight of her death, three molar teeth on the affected side were drawn at different times; after each operation the pain for a time was rendered less severe, but an offensive discharge proceeded from the wounded gums, and for a few days before her death, a discharge of the same kind took place from the nose also." On making a *post-mortem* examination it was found that "the dura mater, immediately under the anterior part of the left middle lobe, was considerably but irregularly elevated by fungoid tumours, equal, collectively, to about the size of a pigeon's egg. There was a corresponding depression in the substance of the brain, which at this spot was slightly adherent and disorganised, but not completely softened, nor was the raised portion of the dura mater ulcerated or materially altered. The bone beneath the tumour was diseased, and in some parts offered no resistance to puncture. . . . . The branches of the portio dura, so far as they were laid bare in the removal of the diseased parts, exhibited no morbid appearance." Unfortunately nothing is said as to the state of the fifth nerve in this case.

Trousseau mentions three interesting cases of cancer of the womb, in which pains of a perfectly neuralgic type were the most striking features of the disease. He says, "I saw a lady, in the year 1845, who was affected with cancer of the inner wall of the uterus. She had every day paroxysms of awful pain, recurring at exactly the same time; the pain was seated in the hypogastrium, and radiated to the kidneys, to the buttocks, and to the thighs, along the track of the principal nerve-trunks. It lasted

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* Romberg's "Manual of the Nervous Diseases of Man." Translated by E. H. Sieveking, M.D. Vol. I., p. 42.

† "Reports of Medical Cases, Selected with a View of Illustrating the Symptoms and Cure of Disease by a reference to Morbid Anatomy." Vol. II, part II., p. 506. London: 1831.

from three to four or five hours, and then ceased, to reappear on the following day at exactly the same hour. In the year 1850, I saw another lady afflicted with the same complaint. . . . I have never known another case in which such excruciating pain was felt. When the pain was at its maximum, the unfortunate patient rolled on the floor, uttering fearful groans. It recurred every day, but, strangely enough, it returned from half an hour to three quarters of an hour or an hour later each time, so that in the space of a month or more, the hour of attack had gone round the clock. The neuralgic paroxysm did not last more than four or five hours, and then quiet was restored, all pain ceased, and there merely remained a very slight sense of fatigue, and weight in the hypogastric region. Again, in 1862, I saw a Grecian lady, who had exceedingly profuse menorrhagia and awful neuralgic pain in all the branches of the lumbar plexus. She had fibrous tumours of the walls of the uterus, protruding into the cavity of the viscus. I attended her for nearly a year, and during that period the pain recurred every day with hopeless violence and obstinacy between twelve and two o'clock, and ceased about five or six in the day. Sometimes, though rarely, it occurred during the night, but it then lasted a short time only. The patient was nearly well in the intervals, with the exception that she felt extremely weak in consequence of the loss of blood, and of the nervous shock caused by such intense pain." *

Cancerous diseases of the nerves themselves contiguous to the cancerous tumour in the cases just mentioned may or may not have existed; no evidence on this point is given; but as observed by Dr. Lockart Clarke,† "cancer is frequently met with in nerves, both as a primary and secondary affection. It may occur at any part in the course of a nerve, but it is mostly found near its peripheral extremities. It generally grows to a considerable size, as in medullary cancer of the retina. As a secondary disease it is communicated to the nerve by a contiguous cancerous growth." Dr. Clarke quotes the records of several cases of cancerous growths in the substance of nerves in the different parts of the body; "Dupuytren, removed one from the posterior tibial nerve, which, moreover, presented a series of nodulations, like grape-stones. It was the cause of acute lancinating pains. In another case he found the trifacial nerve transformed into encephaloid substance." Sir Charles Bell, after referring to cancerous disease in the pelvis as a cause of "agonising pains in the foot, records

* "Lectures on Clinical Medicine." Translated by P. V. Bazire, M.D. Part I., p. 489.

† "Nerve-lesions and their more Immediate Effects.." Art. in Holmes's "System of Surgery." Second Edition. Vol. IV., p. 158.

the following case which he justly designates one of unusual interest:—"A man died of agonising burning pain in the sole of his foot, and the poisonous drugs that were administered in the hope of relieving him. Only two days before his death I found a hard tumour like a piece of bone in the ham, and that the pain in the foot proceeded from this. On dissection, I found that the posterior tibial portion of the popliteal nerve was the seat of a soft cancerous mass, which had grown in its substance, and split the fibres of the nerve. Now, it was recollected that this man, a ship's carpenter, had fallen from the side of a ship in dock, and was caught in his descent on a bolt which projected from the ship's side. He was caught by the ham and hung by the leg. There appeared every reason to believe that the injury to the popliteal nerve had caused the disease in it, and that the remoteness of the place of pain had drawn the practitioner's attention from the real seat of the disease." *

Enlarged glands.—Sir B. Brodie† describes a case in which two lymphatic glands, enlarged to the size of large walnuts, were found situated beneath the skin, on the anterior part of the thigh. A considerable branch of the lumbar nerves lay over each of these glands, being thus kept stretched like strings of a violin over its bridge, and giving rise to violent pain and convulsive movements of the leg.

Hernia.—Romberg details at length the particulars of a very instructive case of obturator hernia which proved fatal, and in which, during several years, the patient, a lady, "was seized, from time to time, by attacks of colic, accompanied by nausea, vomiting, dysuria, and violent contracting pains in the epigastrium; the latter extended to the inner side of the right thigh, in which the patient often experienced a sensation, which she compared to cramp in the calves. . . . . Pain of the left arm and left breast, which supervened, confirmed the diagnosis of a neuralgic affection." The post-mortem examination proved these symptoms to have been produced by compression of the obturator nerve, owing to the protusion into the obturator foramen of a small coil of intestine, which ultimately became strangulated by the fibrous membrane." ‡

Neural tumours, or morbid growths in connection with nerves, sometimes produce neuralgia of a peculiarly severe and obstinate character. The smallest kind are known as *painful subcutaneous tubercles;* the larger kind, as *neuromata.* The former are always firm, sometimes hard, and have a fibrous,

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* "Nervous System of the Human Body," p. 370.
† Works, Vol. III., p. 139, quoted by Dr. Lockart Clarke.
‡ "Nervous Diseases of Man." Vol. I., p. 75.

or fibro-cartilaginous structure. Their size varies from that of a millet seed to that of a pea or a grain of oat. They are situated in the subcutaneous areolar tissue, and are generally more or less embedded between the fibres of the nerves, which are separated and stretched over them. Sometimes, also, they have a close connection with a subcutaneous vein in the neighbourhood of the nerve. They are generally solitary, and mostly confined to the upper or lower extremities, especially the former. Women are more subject to them than men: of eighteen cases collected by Wood, fourteen were women. This small subcutaneous tubercle is a source of the most acute pains, which dart like electric shocks along the course of the nerve, sometimes in both a peripheral and central direction. The pains recur very irregularly, and last, at each attack, from ten minutes to two hours or more. Neuromatous tumours have been found of every intermediate magnitude between a small grain of wheat or oat and a large melon. They are of various shapes, and are situated either between the neurilemna and the nerves, or in the connective tissue between bundles of the nerves. A solitary neuroma, whether traumatic or idiopathic, is a source of the most violent agony, which shoots along the nerve like sudden electric shocks; the pain is sometimes acute, but is always aggravated by pressing or touching the tumour, which seems, during the paroxysm, to be in a state of erythism. After the disease has existed for a length of time, the pain, which at first occurred only in paroxysms, may become continuous.*

Abnormal growths and other diseases of bone were believed, by Sir Henry Halford, to be the chief causes of neuralgia; and though he exaggerated their importance in this respect, and certainly in some cases which he adduced mistook effects for causes, there can be no doubt these affections do sometimes operate as he described. Probably, the case of facial neuralgia mentioned in his essay, in which there was disease of the antrum of Highmore, and in which exfoliation of a part of it was followed by complete cessation of the pain, was one in which the neuralgia really originated in the osseous disease. Portal relates a case, quoted by Romberg, in which, owing to excessive curvature of the lower false ribs, the sigmoid flexure was so compressed by them as to cause the fæces to accumulate in the descending colon, and thus to induce "very violent pains in the great toe of the left foot." The pains recurred

* This paragraph is an abridgment, in the author's own words, of the valuable section on the subject by Dr. Lockart Clarke, in his article, "Nerve-lesions and their more immediate Effects," already several times referred to.

three or four hours after dinner, "and generally ceased after a copious motion." Mayo relates a case in which, on dissection, the posterior surface of the spinal cord was found covered with cartilaginous and osseous laminæ, the pressure of which on the spinal cord had caused such intense pain in the knee of the patient, a woman, "that it was thought necessary to perform amputation of the thigh; it was ineffectual, for the pains continued." The following case, in which necrosis of the lower jaw, consequent on fracture, seems to have induced severe neuralgia, is peculiarly interesting, because it is one of the few examples in which, so far as appears from the narrative, excision of a part of the affected nerve resulted in a permanent cure.

"J. F., aged twenty-eight years, under the care of Mr. Wormald, St. Bartholomew's Hospital, served in India before Delhi. During an engagement, the right side of his lower jaw was broken by a blow from the butt end of a pistol. He was carefully treated in hospital, but from time to time, at intervals, small pieces of bone became necrosed, and were thrown off by the mouth. Two years after the injury, when the fracture appeared repaired, he began to suffer intense pain around the seat of the fracture. The pain was most agonising, fixed in one spot, not radiating up the face, much increased on eating or on any local pressure, and unaccompanied by any twitchings of the muscles. The pain came on for a short time nearly every minute, so that he would stop in the midst of a sentence, and seemed as if suffering most severely. He had not been free from pain for five minutes for the previous twelve months. He took large doses of quinine, of steel, and of various other drugs, with absolutely no relief. Morphia was injected into the gum, with almost no effect, on three several occasions. On February 2, 1863, Mr. Wormald cut out a piece of the inferior dental nerve. He left the hospital in ten days completely cured.

"He presented himself at the Surgery on March 17th. A small spicula of bone had been cast off into his mouth soon after he left the hospital, but with that exception, the operation had caused him no inconvenience, and had completely relieved his pain."

Syphilis is sometimes a source of neuralgia, which is produced by syphilitic deposits in the nervous centres themselves, by exostoses, by periosteal swellings, by nodes, by fibrous tumours, by ulcerations, and by necrosis. If neuralgia occurs in a person who is known to have suffered from syphilis, or to be tainted in any degree by that disease, a reasonable suspicion may be entertained that the nervous disorder is of syphilitic origin, and the suspicion is especially likely to be justified in those cases in which the

syphilitic symptoms observable are those of the tertiary form of the disease."*

Over-straining.—Sir Charles Bell gives two cases (94 and 97) in which over-straining seems to have been the cause of neuralgia: "Miss G., in pulling repeatedly on a stop-bell, sprained her arm, and to this she attributes her complaint. This is countenanced by the pain and flat tumour of the wrist, feeling like an effusion into the sheath of the flexor tendons. Her fingers are bent, and it gives her pain to extend them. She is subject to a pain which extends up the arm to the side of the neck, and to the origins of the nerves of the axillary plexus." In the second case, the patient, a woman, æt. twenty-three, "injured her wrist by over-straining; and this was followed by inflammation, extending to the elbow and shoulder." Twelve months after the accident, she was sent to consult Sir Charles Bell "for a painful affection, extending from her arm to the shoulder, neck, and face, and which has resisted every method of treatment employed for its cure. . . . The pain is incessant, but is aggravated by touching or moving the arm. . . . . She fears she may lose her right eye, the severity of the pain is so great."†

Contusion of Nerves is a frequent cause of neuralgia; and in many cases of this kind it is probable that the disease is induced by the swelling, associated with the inflammation, resulting from the mechanical injury, the more especially as the neuralgia does not as a rule supervene until a considerable time after the accident. Macculloch has recorded two cases in which the exciting cause was a bruise. In the first, "a blow on the arm, producing a severe bruise," caused "a regular neuralgia of a quotidian character." He says,—"It was remarkable, however, that the seat of the neuralgic acute pain, which was in the middle of the radial nerve, and which extended in the usual manner to the shoulder, was not at the place of injury, but considerably distant from it." The other case, "of a very defined character, and of which," says this observant physician, "I had a perfect knowledge from the beginning to the end, was a case of neuralgia, quotidian also, in a toe; and it followed immediately after a blow or bruise, produced by slipping against a sharp pointed rock. The surface injured was so small as scarcely to have been perceived at the time, while the extreme severity and duration of the pain was a cause of great surprise to the patient"—a medical

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* See Dr. E. Lancereaux's "Treatise on Syphilis: Historical and Practical. Translated by G. Whitley, M.D. Vol. II., p. 91, et seq.; also "A Treatise on Syphilis." By W. J. Coulson. London. 1869. P. 295, et seq.

† "The Nervous System of the Human Body." Pp. 366-7.

man.* Nerves are occasionally compressed or strangled by accidental inclusion within a ligature applied to an artery, and extremely severe neuralgia is sometimes originated in this way.

The complete division of nerves, either by accident or by amputation, may also give rise to the same malady. Mr. Langstaff ["Military Surgery," p. 191] has related an exceedingly interesting and instructive case of this description. After amputation at the fore-arm in a female, the stump did not unite favourably, and she suffered the most distressing agony, which so affected her health that she became extremely nervous. "There was a constant state of convulsive action of the muscles of the stump: everything that could be done to improve her health and relieve pain was fairly tried for several months, without the least good effect; she was hysterical, and the paroxysms were frequent. After the stump had healed, a pulsation almost aneurismal could be felt in the situation of the ulnar and radial arteries. Having seen in several cases symptoms similar to those caused by the extremities of the nerves becoming ganglionic, and a second operation rendered requisite, Mr. Langstaff removed the arm above the elbow-joint, and previous to securing the arteries, drew out each nerve to the extent of half an inch from the surface of the stump, and cut through them to prevent their interrupting the progress of cicatrisation of the integumental parts. The patient was relieved of all her painful sensations—a good stump was made, and her health improved. On examining the amputated part, the median, radial, and ulnar nerves were found remarkably large; the extremities of the two latter were greatly increased by deposition of organised lymph."†

"In several instances of injury of the nerve in amputation," says Sir Charles Bell, "also when the nerves have become entangled in the cicatrix of the stump, the pain has struck into the face and jaws, producing a tic." He relates a case, No. 92, of this kind. A lady "accidentally cut her finger: Sir Astley Cooper cut across the nerve under the impression of its being partially divided, and that her severe pain arose from this circumstance. It appears that on the accident to her finger, a red line was observed running up her arm, followed by pain and swelling in the arm-pit. Her pains are dull; they extend down the arm, and round the shoulder. She is here in great alarm, lest the nerve

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* "Marsh Fever and Neuralgia." Vol. II., pp. 153-4.

† "Nerve Lesions and their more immediate effects." By Dr. Lockart Clarke. Holmes's "System of Surgery." Second edition. Vol. IV., p. 163.

on the other side of the finger should be divided as had been proposed."*

Sir Charles Bell also gives a case, No. 98, of neuralgia induced by a cut with the point of a knife in the angle between the thumb and fore-finger. The wound was situated on the palmer side of the first joint; it was followed by considerable hæmorrhage, but this was arrested by pressure and a styptic. The wound did not heal for a month. It was attended with severe pain while healing, although there was little inflammation around it—the pain reached upwards towards the elbow. After the wound had been closed, the pain ceased, but it returned a month ago with great severity. She complained of a severe pain in the ball of the thumb, which extends upwards along the arm, as far as to the side of the face. The mother relates a story of her daughter having been much frightened by an apparition. From this time she became much depressed in spirits, and her health affected. The pain commenced gradually without any assignable cause, and became, in the course of a short time, of the most excruciating kind; it almost made her "lose her mind." The attacks begin with a severe throbbing in the original wound, attended with a sense of burning heat (although the hand is cold). This extends slowly up the arm, then fixes in the shoulder, and affects the teeth of the same side. There is occasionally a swelling of the side of the face, and redness and weeping of the left eye accompanying these attacks: they begin in the evening to be more severe than at other times; yet the suffering continues during the day, and often wakes her at night. The wound has no redness, and the cicatrix appears perfectly sound, yet it gives her great pain to press it with any force, and she cannot use it for the simplest action without bringing on a severe attack. Her health has been much affected since the pain began to be so severe: she has no appetite; has nausea."†

Incomplete division of nerves "is, in general," says Dr. Lockart Clarke, "productive of much severer consequences than when the division is complete. If nearly the whole thickness of the nerve be divided, the free portions will retract, and put the undivided portion on the stretch."‡ This tension may or may not give rise to serious results: the effect in each case will be determined by the nature of the nervous irritability of the patient. I shall hereafter give a remarkable case of this kind.

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* "The Nervous System of the Human Body." Pp. 365-6.

† *Ibid.* Pp. 367-8.

‡ "Nerve-Lesions and their more immediate effects." By Dr. Lockart Clarke. Holmes's "System of Surgery." Second edition. Vol. IV., p. 164.

Incised wounds of nerves seem to originate neuralgia much oftener than does either complete or incomplete division of them. "Hamilton relates [in the *Dublin Medical Journal*, Vol. XIII., Case iii., p. 42] the interesting case of a girl, aged seventeen, and of nervous temperament, who, while cutting bread, wounded the septum between the thumb and forefinger of the left hand. The pain from the first was very severe, became still more so, and extended to the thumb, forefinger, back of the hand, up the forearm, inside of the arm to the axilla, shoulder, and side of the neck. These and other symptoms continued for nearly three months after the external wound had healed, when she got a fright in the street, and fell into an hysterical fit. After two days of hysterical symptoms, all pain and swelling left the arm, and never returned." * The following case is recorded by Mr. Wardrop :— "A young gentleman cut the distal phalanx of the left thumb obliquely across the radial side with a gun-flint. The wound readily healed ; but, on the patient living freely, in a few days the thumb became painful, and although no change in its appearance could be perceived, and the cicatrix seemed perfectly natural, the pain extended to the forefinger, the radial side of the middle finger, and up the arm as far as the neck and side. The pulse was frequent and tense, the face flushed, and the tongue white and frothy ; copious general bleeding gave almost immediate relief. The symptoms, however, returned and yielded to another bleeding, with copious purging. The paroxysms of pain were several times distinctly produced by mental excitement, and on some occasions were brought on by taking even a small portion of animal food. The wounded thumb, which was at all times painful and extremely tender to the touch, was sometimes seized with paroxysms of agonising pain, which was no longer confined to those fingers supplied by the radial nerve, but extended over the whole hand, arm, neck, and even down the back. Mr. Wardrop divided the injured nerve, with complete abatement of all the symptoms. The success, however, was not permanent ; for, during several weeks after the operation, whenever he took food of difficult digestion, when purgatives did not readily operate, or when his mind was at all excited, the pain attacked his hand and arm, sometimes severely. After that time he completely recovered. The point of the thumb, however, always remained numb ; but, whenever the patient's stomach was disordered, he felt pain in the thumb."† These cases, illustrative of the induction of neuralgia

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* "Nerve-Lesions and their more immediate effects." By Dr. Lockart Clarke. Holmes's "System of Surgery." Second edition. Vol. IV., p. 166.

† "Medico-Chirurgical Transactions," Vol. XII., p. 205. Quoted by Dr. Lockart Clarke.

by slight wounds, prove so strongly the correctness of the doctrine expounded in this volume, and are otherwise so instructive and interesting, that I am tempted to give one more example of what may be the effects of an apparently insignificant cut. The history of the case in question, which is given at great length by Mr. Swan, has been skilfully abridged by Dr. Lockart Clarke as follows :—" A young lady, aged twenty-three, on December 20, 1822, wounded the ulnar side of the second finger of the left hand, near the middle of the second phalanx, while cutting an orange. The pain extended to the centre of the left breast, and up the left side of the neck to the face, along the branches of the facial portion of the seventh (?) nerve. On the sixth day after the accident, the wound had entirely healed, but was extremely tender. The pain was excruciating when she attempted to move the arm with the hand in a state of pronation. Whenever she read, pain was produced in the superciliary nerves of the left side after about five minutes. As the patient's health was suffering, on January 11, 1823, Mr. Swan divided the digital nerve near the middle of the first phalanx. She was immediately and completely relieved, and could move her arm in any direction without pain ; but, as the effects of the operation were not permanent, on March 5, the finger was amputated at the joint between the metacarpal bone and the first phalanx, and on examining it at the original wound, a small fibril of the digital nerve was found divided ; the end of this, next the tip, was found incorporated with the cicatrix ; the other was formed into a small bulb. At the place of the division of the nerve at the first operation, both its extremities were incorporated with the cicatrix, as were those of the dorsal branch, which had also been divided. Although her local and general symptoms were much relieved by the operation, she continued to feel pain in the hand, arm, neck, and face ; and about four months later (in July), she began to complain of her spine. About the end of November she complained very much of pain in her back, with tingling in her arms, and a difficulty of supporting herself erect. Percussion along the spine produced uneasiness in every part, and much pain about the lower dorsal vertebræ. Some time after she was seized with violent pain in the left knee, which lasted for two or three days. Pressure on each side of the spinous processes of several of the vertebræ produced pain, and percussion with a key made it very severe : she had difficulty in voiding her urine. In October, 1824, she complained of numbness and loss of sensation in the left hip and shoulder, and of pain at the back of the neck, with a feeling as if the neck could not support the head. At the latter end of the year 1825, and beginning of 1826, she was affected by dizziness, in fits of which she fell down, but never

entirely lost her consciousness. Her left arm and leg were weaker than the right. When the membrane lining the left external auditory meatus was touched, cough was produced. Up to March, 1829, she had varying degrees of pain and weakness, soreness in the throat, with an appearance of venous congestion, and disorder of the digestive organs, with great tenderness in a spot about the size of half-a-crown at the pit of the stomach; she had also some pain and swelling about the uterus and vagina. When sleeping on her left side, she very frequently awoke with pain in the amputated finger. Tic douloureux was brought on by either exciting or depressing emotions, by exposure to strong light, and by fits of sneezing, with which she was frequently troubled. When Mr. Swan last saw her, on October 30, 1833, she was nearly in the same state as she had been in for a long time; but we are left in ignorance of the subsequent course of the disease. The patient's father had a paralytic attack."

Puncture-wounds may involve injury to nerves of a kind giving rise to terrible neuralgia. In the "Medico-Chirurgical Transactions," Vol. VIII., p. 246, also quoted by Dr. Lockart Clarke, "Mr. Wardrop has related the case of a woman who pricked the forefinger of her right hand, near the point, with a gooseberry thorn. The wound was immediately followed by great pain, swelling, and redness, which in a few days extended along the forefinger and adjoining phalanx of the middle finger. At the end of three months the pain and swelling disappeared, except from the two phalanges of the wounded finger, which remained extremely painful. The patient's general health suffered considerably, and she had severe nervous paroxysms two or three times a day, during which the pain extended along the finger to the back of the hand, and between the two bones of the forearm, darted through the elbow-joint, and up the back of the arm to the neck and head, producing a sensation at the roots of the hairs as if they had become erect. To these symptoms succeeded dimness of sight, and subsequently the pain extended to the stomach, producing nausea and vomiting. She had constantly the feeling of a lump in her stomach, and vomited after taking food or drink. At the end of seven months, three incisions were made at the point of the finger, but they gave no relief. She was afterwards completely cured by amputation of the finger." Macculloch mentions the case of a young woman who, by pricking the end of her middle finger with a needle, brought on "a regular periodical neuralgia in that finger." The disease "did not occur till a few days after the accident;" and some weeks afterwards, when she consulted Dr. Macculloch, it had "extended all the way to the shoulder" and recurred as he says with "periodical and quotidian regularity."*

* "An Essay on the Remittent and Intermittent Diseases, including generically Marsh Fever and Neuralgia." Vol. II., pp. 151-2.

Foreign Bodies, buried or imbedded in or beneath the skin, are peculiarly potent causes of neuralgia. The author last quoted also gives a good example of this kind: The seat of injury "was a finger, in which a fragment of glass had been buried, so as to leave a small induration; the usual pain extending upwards to the shoulder, with increase of heat and sensibility in the hand, and particularly about the injured part during the paroxysm, which was always perfectly definite in duration, though not regular in recurrence, during the many years that he had opportunities," he says, "of renewing his inquiries."

Reviewing the foregoing exposition of the predisposing and exciting causes of neuralgia, the reader will observe that, considered generally, they act as predisposers to *excitement* or as immediate *excitants* of the nervous system, and that their *modus operandi* consists in the production of morbidly excessive affluxes of blood in the nervous centres related to the affected nerves. Even in those cases in which neuralgia arises out of conditions produced by agencies of a degenerative kind, those agencies nevertheless operate so as to induce hyperæmia or to facilitate its induction in the nervous centres actually implicated. Aborginal weakness of the vascular system is a predisposing cause not only of great irregularities of the general circulation of the blood, but of capillary dilatations within the nervous centres—conditions which readily become the proximate causes of nervous excitement; and, as I have also shown, the same result may be induced by gout when its deteriorating influence is exerted on blood-vessels ramifying amid nervous structures. Even when neuralgia occurs in phthisical patients, and is presumably due to the presence of pulmonary tubercles, or other morbid deposits in the lungs, they act as *irritants* and thus produce centric *excitement* and consequent hyperæmia. The same result is caused no less indubitably, in the manner I have explained, by alternations of temperature, by sleep, by excessive fatigue—whether bodily or mental, and even by mental depression itself. Dental disorders which are recognised by every writer on neuralgia as among its pre-eminently fruitful sources, are notoriously *irritants* or *excitants* of the medulla oblongata which thus in thousands of children every year becomes, through the process of teething, fatally *influenced*. In fact the whole group of agencies described in the present chapter owe all their force as causes of neuralgia to their capacity of acting as irritants or excitants. Now if this statement is correct—if the predisposing causes of the malady are such by virtue of their power of inducing a state of preternatural irritibility, if the exciting causes are such because their action is that of irritants, and if the universally recognised

physiological maxim, *ubi irritatio ibi fluxus est* be really true—it is impossible, I think, to escape from the conclusion that the *proximate* cause of neuralgia, or the essential condition precedent of its genesis, is hyperæmia of the sensory nervous centre related to the nerve or nerves in which the pain is experienced.

Due consideration of the nature and *modus operandi* of the causes of neuralgia, enumerated in this and the preceding chapter, suggests, moreover, the inference that, inasmuch as in a large proportion of cases of that disease, the cause is discoverable and is found to consist of agents the action of which induces nervous irritation and excitement even in those cases in which, during life, at all events, no cause of the malady can be discovered, and in which it seems, therefore, most deserving the name—"immaterial neuralgia," applied to it by Dr. Handfield Jones, there, nevertheless, exists a cause as material and substantial as any of those which I have described. Now, if this inference is correct, and I feel assured that it is, one of the two following conclusions is, as it seems to me, inevitable: either (1) neuralgia, as a distinct species of disease, differentiable from other kinds of pain, does not and cannot exist; or (2) all kinds of pain, however ostensibly caused, and however unlike that which is now generally taught in medical works regarded as classical, to be typically neuralgic are, notwithstanding, examples of neuralgia as real and indubitable as the most "immaterial" or seemingly causeless pain now considered characteristic of the disease. I adopt the second of these conclusions, which, while seeming to me more accordant than the first is with the facts in question, commends itself alike to the scientific inquirer and to the practical physician as a generalisation by which all the varieties of pain, wherever located, and however originated, are reduced to one denomination, are shown to be due to one and the same *proximate* cause—hyperæmia of the sensory centre affected, and therefore are also shown to be remediable or relievable by one and the same method, the sole aim of which is the removal of that cause.

CHAPTER XI.

OBJECTIONS ANSWERED: DR. ANSTIE'S PATHOLOGY AND ETIOLOGY OF NEURALGIA.

SINCE the concluding paragraphs of the preceding chapter were written, Dr. Anstie has published his book, entitled "Neuralgia and the Diseases that resemble it." That two works, about equal in size, devoted to the same subject, and advocating hypotheses concerning it diametrically opposed to each other, should be published in the same country at nearly the same time, is a remarkable coincidence, and one by no means reassuring to those who are inclined to doubt whether the principles and practice of medicine can ever become really scientific. I endeavour to show that all kinds of pain, wherever seated and however produced, may, by an exhaustive analysis, be proved to be due to one and the same proximate cause, and may, therefore, be reduced to one general denomination; while Dr. Anstie's "principal object" in writing his volume is "to vindicate for neuralgia that distinct and independent position" which he has "long been convinced it really holds." I endeavour to demonstrate that the proximate cause of all neuralgias, as, indeed, of all kinds of pain, consists in hyperæmia of the sensory nerve-centre in which the centripetal end of painful nerve is implanted; Dr. Anstie repudiates this doctrine, and tries to prove the truth of the proposition that the nerve-centres of sensory nerves affected with neuralgia are in a state of "*atrophy which is usually non-inflammatory in origin.*" It is manifest that pathological views so widely apart as these must exert very divergent influences on the treatment of neuralgia, and that though they may both be wrong, they cannot both be right. The professional status of Dr. Anstie forbids the supposition that he would advocate a doctrine in support of which at least seemingly valid arguments may not be adduced, and I esteem myself fortunate, therefore, in having the advantage of considering his arguments before finally committing myself to the doctrine advocated in the preceding pages. Moreover, as his criticism is, for the most part, implicit rather than explicit, it has a purely intellectual and impersonal character, which ensures for it at once both a cordial welcome and an especial respect. When, in Chapter II., I gave a brief sketch of several pathological theories of neu-

ralgia, Dr. Anstie's doctrine had only been published in outline, and I did not think it expedient to discuss it; but now that he has fully developed and elaborated it in a volume of 300 octavo pages, containing, it is to be presumed, all the evidence adducible in its favour, I feel it incumbent on me to examine that evidence with especial care. To read an elaborate exposition of the ideas of a man who differs from me, and to have the opportunity of examining from his point of view all the facts marshalled by him in support of those ideas, as well as of ascertaining the strength of the arguments by which he seeks to establish them, is, in fact, to receive the best possible help in searching out the errors or weaknesses of my own doctrine.

The final conclusions at which Dr. Anstie arrives are expressed in his own words, as follows:—"That the essential seat of every true neuralgia is *the posterior root of the spinal nerve in which the pain is felt*, and that the essential condition of the tissue of that nerve-root is *atrophy, which is usually non-inflammatory in origin*" (p. 110). Further on this statement is reproduced, with a modification:—"For the chief *material* element in the production of the neuralgias of ordinary life we are really driven, by exclusion, to the condition of the posterior roots of special nerves, in some cases, perhaps, to the (spinal) ganglia on which the nutrition of these roots probably is considerably dependent" (p. 143). And, again, he says:—"The morbid change in the nerve-centre is probably, in the vast majority of cases, an interstitial atrophy, tending either to recovery, or to the gradual establishment of grey degeneration, or yellow atrophy, of considerable portions or the whole of the posterior root, and the commencement of the sensory trunk as far as the ganglion" (p. 157).

It will be observed that there is considerable uncertainty and some discrepancy in these statements respecting the exact seat of the morbid condition in question. First, it is located in the posterior roots of the spinal nerves; then, in some cases, *perhaps* in the (spinal) ganglia, on which the nutrition of these roots *probably* is considerably dependent; and, finally, the atrophy is *probably*, in the vast majority of cases, in the posterior root, and the commencement of the sensory trunk "*as far as the* ganglion," without, however, as it seems, including that ganglion. But, indeed, no neuro-pathologist can be surprised when noting the extent of range assigned by Dr. Anstie to the "chief material element in the production of the neuralgias," for every one conversant with the subject knows that there is not a single *post-mortem* observation on record proving that in a case of neuralgia the posterior root of the affected nerve, or the commencement of the sensory trunk as far as the ganglion upon it, or the ganglion itself, was in a state of atrophy. Dr. Anstie feels the want of this kind of evidence, and

accordingly says :—" This doctrine seems at first sight presumptuous, in the confessed absence or extreme scarcity of dissections which even bear at all upon the question " (p. 110). The only *post-mortem* case to which he can appeal at all in seeming confirmation of his doctrine, is the remarkable one recorded by Romberg, which I have already described and accounted for at page 39. " Post-mortem examination showed," says Dr. Anstie, " that the pressure of an internal carotid aneurism had almost destroyed the Gasserian ganglion of the painful nerve, that the trunk and posterior root of the nerve were in a state of advanced atrophic softening, and the atrophic process had extended in less degree to the nerve of the opposite side " (p. 139). Now, I doubt if this case affords any countenance whatever to Dr. Anstie's theory. In the first place it must be borne in mind that if atrophy, in the true sense of the term, were observable at all, it was certainly of inflammatory origin, whereas, according to the theory in question, neuralgic atrophy " is usually non-inflammatory in origin." But, in fact, " the trunk and posterior root of the nerve were " *not,* in any true sense of the term, " in a state of advanced *atrophic* softening," but of *inflammatory* softening, and this inflammatory softening was itself produced by peripheral irritation and excitement of the nerve. In his comment on this case, Dr. Anstie says : " Its most striking teaching is the fact that the acutest agonies of neuralgia can be felt in a nerve, the central end of which is reduced to such a pitch of degeneration, that conduction between centre and periphery must very shortly have entirely ceased, had the patient lived " (p. 139). Now, in a case like this the facts must be described with especial precision, or our reasoning upon them will be useless ; and it must be observed that if the phrase *central end* means, as I think it ought to mean, the root fibres of the nerve which ramify in the substance of the medulla oblongata, they were not reduced to the " pitch of degeneration," stated by Dr. Anstie. The words of Romberg are : " The fifth nerve of the suffering side was softened, and had lost its filamentous structure *at the point where it leaves* the pons varolii, the softening of its fasciculi was perceptible, even within the brain, *in its passage through the* pons and through the crura and cerebellum, and an indurated node was found within them."* There is no evidence here that the root of the nerve—" the central end "—was softened at all, but, on the contrary, the facts described justify the inference that it was not. The focus of softening is stated by Romberg to have been at the point where it leaves the pons varolii, or, in other words, at that part of its *trunk* between the pons varolii and the Gasserian ganglion ; therefore, it seems to me that Dr. Anstie misapprehends the facts when he de-

* " Diseases of the Nervous System," *Syd. Soc. Trans.* Vol. I., p. 44.

rives from this case the lesson "that the acutest agonies of neuralgia can be felt in a nerve, the *central end* of which" is softened to the extent he mentions; and, indeed, no one knows better than himself, that had the *trunk* of the nerve been completely divided, agonizing pain could still have been experienced, and would still have been referred to the region over which the peripheral ends of the nerve were ramified. According to my interpretation of the case, irritating and exciting impressions were continuously streaming into the sensory cells at the root of the nerve in the medulla oblongata from the focus of inflammation and inflammatory softening, and the excitement and consequent hyperæmia thus induced in those cells were the *proximate* cause of the agonies experienced; and inasmuch as that excitement had continued many years, it is probable that the habit of that excitement had become so established that had the patient lived it would have continued even after the trunk of the nerve had been *quite* severed by the inflammatory softening which was going on. There is, moreover, an important point in this important case, in which Dr. Anstie's description diverges so widely from that of Romberg, that I feel sure Dr. Anstie will thank me for calling his attention to an error which has escaped his correction. He says the pressure of the aneurism "had *almost destroyed* the Gasserian ganglion of the painful nerve" (p. 139). Had such been the fact the case would certainly have favoured that part of his hypothesis which supposes that atrophy of the ganglion on the posterior root of spinal nerves is, in some cases, "the chief material element" in the production of neuralgia. But the *ipsissima verba* of Romberg are—"Both Gasserian ganglia, and their three branches *presented no abnormal appearance*, except that the ganglia were rather paler than usual."* And, again, referring to "the suffering side," he says:—"The Gasserian ganglion, *though normal* in structure, was subject to tension and dragging by the aneurysmatic swelling of the carotid and its pulsations."

I have devoted considerable space to this remarkable case, because it is the only one adduced by Dr. Anstie in which *post-mortem* examination is even alleged to show that in a case of neuralgia the posterior root and ganglion of the affected nerve "were in a state of advanced atrophic softening," and I think I have proved that when the report of this case is read as Romberg wrote it, and is then carefully considered, it lends no countenance to the peculiar theory for the support of which it is cited.

This solitary case, even if Dr. Anstie's description and interpretation of it were correct, could scarcely have suggested the novel hypothesis which he has propounded concerning the proxi-

* "Diseases of the Nervous System," *Syd. Soc. Trans.* Vol. I., p. 43.

mate cause of neuralgia, and in examining the evidence of other kinds, which I shall refer to presently, and which he adduces in support of that hypothesis, I cannot believe that a consideration of the bearing of any part of it, or of the whole together, could have originated that hypothesis: after carefully noting the significance which he assigns to the several groups of facts which we have each made use of, I do not find a single group, or indeed a single fact, that I can charge myself with having misinterpreted, or the obvious meaning of which I have either misapprehended or strained in any degree while presenting it as evidence in proof of the doctrine advocated in this volume. I am, therefore, forced to the conclusion that Dr. Anstie's pathology of neuralgia is not an outgrowth from the facts collected together in his chapter on the subject, but that it is an offshoot from that broader and still more revolutionary doctrine concerning the nature and origin of pain, of which Dr. C. Blande Radcliffe is the chief expounder, and which I have already submitted to critical examination. Indeed, Dr. Anstie refers to that doctrine in the language of a believer; and in concluding his remarks on "Pain in General," he says (at p. 6),—"We may sum up the considerations which have now been adduced, in the following general propositions, *which will tend to simplify the examination of the various painful disorders which we are about to discuss*:—1. Pain is not a true hyperæsthesia; on the contrary, it involves a lowering of true function. 2. Pain is due to a perturbation of nerve force, originating in dynamic disturbance either within or without the nervous system. 3. The susceptibility to this perturbation is great in proportion to the physical imperfection of the nervous tissue, *until* this imperfection reaches to the extent of cutting off nervous communications (paralysis)." These sentences contain Dr. Anstie's version of Dr. Radcliffe's doctrine by which Dr. Anstie was evidently influenced while writing his book on Neuralgia, and which of course, therefore, both suggested his supplementary theory—atrophy of the posterior root of the affected nerve—and dictated his peculiar interpretation of the meaning of the facts presented as evidence of the truth of that theory. I shall now ask my readers to review those facts with me, and then to judge whether they really support the pathology of neuralgia which he has propounded, or that explained in this volume; and, further, whether, if they prove one of them to be correct, they do not prove the other to be erroneous.

Dr. Anstie occupies several pages in discussing "the position of neuralgia *as a hereditary neurosis*," and has added to the pre-existing stock of information on the subject a number of original and valuable observations. He concludes that "neuralgia is eminently a hereditary neurosis," and adds,—"Indeed, it may be taken as

a recognised fact, among the more advanced students of nervous diseases, that hereditary neurosis is an important antecedent of neuralgia, in at least a very large number of instances" (p. 116). Having, as he believes, established the proposition that "neuralgia is eminently a hereditary neurosis," he seems to think that he has advanced a long way towards the establishment of the further position, viz., that the condition of the centripetal ends of nerves affected with neuralgia is one of abnormally low vitality, approaching at least to that of atrophy; for he assumes, but does not prove, that the whole group of neuroses, whether affecting the sensory or motor centres, consists of disorders the characteristic feature of which is deficient vitality of those centres. I submit, however, that there is a wide gulf between the proof that neuralgia is, in any given proportion of cases, a hereditary neurosis and the proof that the disorder consists in lowered vitality of the centripetal end of the affected nerve; and I must observe that until this gulf is bridged, the establishment of the doctrine that neuroses in general, and neuralgias in particular, are hereditary constitutes no proof that the posterior root of nerves affected with neuralgia are either atrophied or in a state approaching in any degree to that of atrophy. Hypertrophy of that root, or habitual hyperæmia of the nerve-cells amid which that root is implanted, may also be one of the neuroses, and as easily transmissible as is any other form of nervous disease. Therefore, I conclude that Dr. Anstie's pages on the position of neuralgia as a hereditary neurosis do not strengthen his general argument that its proximate cause is atrophy of the posterior root of the affected nerve.

Dr. Anstie next refers to locomotor ataxy, the pains of which, he says, "bear a striking resemblance to neuralgic pains." He adds,—"The fact that they are an almost if not quite constant feature of a disease which is from first to last an atrophic affection (mainly of the posterior columns of the cord) in which the posterior roots of the nerves are almost always deeply involved, has a bearing on our present inquiry too obvious to need further remark." (P. 118.)

That the bearing of the fact here mentioned is the one indicated by Dr. Anstie I am constrained to doubt; and the statement that locomotor ataxy "is from first to last an atrophic affection," seems to me especially questionable. In the early stages of the disease it is never fatal; and, so far as I am aware, no *post-mortem* examination has ever been made of a person who, while suffering from locomotor ataxy *in its initial stage*, died of some other disease. And if no such examination has ever been made, it is clear that during that stage the condition of the posterior columns of the spinal cord, and of the posterior roots of the nerves, has never been observed, and that it can only be

inferred from observation of the symptoms during the course of the disease, and from those *post-mortem* examinations of the spinal cord and nerve roots which have actually been made and recorded.

The accessible circumstantial evidence bearing on this question, seems to me to lead straight to the conclusion that, *during the early stages* of the disease, *inflammation* of the affected parts of the spinal cord, and of the posterior roots of the nerves, constitutes the chief material change giving rise to the symptoms then most generally observable. Among the symptoms not unfrequently observable are vomiting, diarrhœa, morbidly excessive and prolonged desire for sexual intercourse, attacks of faintness or actual syncope, general chilliness with especial coldness of the feet, and obstinate constipation. Now the three symptoms first named are certainly effects of the excessive action of the spinal cord, while the others denote excessive action of the collateral ganglia of the sympathetic; and the more carefully the *post-mortem* condition of the spinal cord affected with the disease in question is examined the stronger grows the conviction that though the posterior columns are the chief seats of the morbid change it nevertheless pervades the adjoining elements of the cord to a considerable extent, the amount of perversion differing, of course, in different cases. "The disease," says Dr. Hammond,* "may be first manifested by a feeling of constriction around the body, *like* that which is so common in acute myelitis;" indeed, he says this feeling "is rarely absent;" and, according to Rosenthal,† it is often experienced. Dr. Clarke writes to the same effect: "The patient *very commonly* complains," he says, "of a feeling of constriction round the waist and chest, as if a tight band of variable breadth, or a tight waistcoat, were compressing the parts. There is also not unfrequently experienced a tightness, weight, and bearing-down of the abdomen, as if its contents would be forced out; and at other times severe griping pains attack the same part."‡ The presence of this characteristic symptom of inflammation of the spinal cord denotes in a decisive manner, as it seems to me, the nature of the morbid process constituting the proximate cause of the principal phenomena of locomotor ataxy. And, according to the concurrent testimony of Rosenthal,§ Trousseau,‖ Lockart Clarke,¶ and other observers, in those cases in which death occurred during the latest stages of the disease, *post-*

* A Treatise on "Diseases of the Nervous System." New York: 1871, p. 494.

† "Handbuch der Diagnostic und Therapie der Nervenkrankheiten," Erlangen: 1870. Section on Tabes dorsualis.

‡ Art. on "Locomotor Ataxy" in St. George's "Hospital Reports." Vol. I.

§ *Op. cit.* ‖ Lectures on "Clinical Medicine."

¶ Art. quoted above.

mortem examinations have revealed indubitable traces of inflammation which has evidently had an extensive range within the area of structural change. The membranes of the spinal cord "are sometimes apparently unaffected," says Dr. Lockart Clarke; "but generally," adds this very accurate observer, "they are much congested, and I have seen them thickened posteriorly by exudations, and adherent not only to each other, but to the posterior surface of the cord;" and, along with the "atrophy and disintegration of the nerve-fibres, to a greater or less extent," there is "hypertrophy of the connective tissue." Dr. Rosenthal, who confirms Dr. Clarke's observations, also testifies to the existence of the following evidences of inflammation: dilatation of the capillaries and hyperæmia of the posterior columns; slight injection, and deposits of, hæmatin in the grey matter, which in the dorsal and lumbar region of the cord has been found to be especially red and hyperæmic; marked congestion of the spinal ganglia. Evidence to the same effect is also given by Trousseau, who indeed, appears to me to appreciate its significance correctly.

According to my interpretation of the phenomena of the disease, the atrophy, characteristic of its later stages, is a secondary consequence of the inflammation, evidences of which are a characteristic feature of the *post-mortem* phenomena, and which, though it may subside to a considerable extent after its first onset, continues in a subdued or chronic form throughout the whole course of the malady. Now, the pains which, as a rule, are among the first of its symptoms, hold, as stated by Dr. Anstie, "a prominent place" in its "earlier history," and generally persist, with varying severity, until its close; and, given the slow inflammatory process, just mentioned, of the posterior columns of the cord, and of the posterior nerve-roots, structurally and immediately connected with them, we have, as it seems to me, the fulfilment of the very conditions which I affirm to be essential for the production of neuralgia, viz., hyperæmia of the sensory nerve-cells. It is to be presumed that when any particular group of the affected sensory cells have been for some time the seat of chronic inflammation, and have thus been constrained to persist in functioning an abnormally long time with preternatural energy, they become exhausted, and die; and thus atrophy succeeds to the inflammation which caused it. But this low form of inflammation, creeping from cell to cell, and thus attacking adjoining cells one after the other, creates successively new foci of that condition—hyperæmia of centripetal nerve-cells—on which the genesis of pain depends; and obviously when that hyperæmia reaches to a certain grade of inflammation, its track will be marked by textural death, or the atrophy in question. Dr. Lockart Clarke mentions one interesting case in which the pains "never make their attack except when

the patient is warm ;" but it would be very difficult to understand how this can be the case if the condition precedent of pain is anæmia of the sensory cells, or posterior roots of the nerves affected. I may add here that, in two cases of the disease in which I have tried the effects of cold to the spine, marked benefit was conferred—a fact which I explain by supposing that, though, of course, the already atrophied parts could not be revivified, the parts which, while still vital, were so hyperæmic as to be in a state of morbidly intense functional activity, or even in a state of chronic inflammation, had their excessively intensified nutritive processes checked and lessened by the sedative influence of ice along the spine, and were thus, more or less restored to health. I could adduce from a full consideration of the causes and symptoms of the disease, and of its *post-mortem* phenomena, several other arguments proving that hyperæmia and inflammation of the cord are the initial stages of the malady ; but I have, I think, already said sufficient not only to justify me in designating Dr. Anstie's statement, that locomotor ataxy " is from first to last an atrophic affection," as especially questionable, but also in appealing to the history and *post-mortem* phenomena of the disease in confutation of the doctrine which he, on the contrary, thinks they help to confirm.

" Equally important to our investigation," says Dr. Anstie, " is the fact that pains, closely resembling neuralgia, are not very uncommonly a part of the phenomena of commencing, and more frequently of receding, spinal paralysis " (p. 118). Now, unless it can be proved that in those cases in which the pains in question are felt there is no inflammation, and no undue afflux of blood in the affected part of the spinal cord, the existence of such pains afford no confirmation of Dr. Anstie's theory. But, on the contrary, if when they are experienced some grade of inflammation or undue afflux of blood in the affected part of the cord obtains, their existence constitutes evidence in confutation, rather than in support of, that theory. I shall not adduce facts here to prove that the two conditions co-exist, but appealing to the best accessible evidence in support of my statement, I affirm it to be probable that they do so, and, therefore, that Dr. Anstie by referring to those pains does not strengthen but weakens his argument.

Dr. Anstie proceeds, " We are also certainly entitled to adduce the example of the so-called neuralgic form of chronic alcoholism as an instance of the close relationship of neuralgia to other central neuroses. I refer to those cases, more common perhaps than is generally admitted, in which pains in the extremities, often quite resembling neuralgia in their intermittence, are either superadded to or take the place of the muscular tremors and general restlessness that are more popularly considered as the essential

nervous phenomena of chronic alcoholic poisoning." It is not uncommon, he says, for these pains "to occur interchangeably with true neuralgia in the same person" (p. 119). Here again, as it seems to me, he calls up witnesses against himself. It is well known that the first and most characteristic effect of each successive dose of alcohol is due to the production of hyperæmia of the nervous centres; and, of course "chronic alcoholism" is a condition induced by the persistent habit of taking frequent doses of alcohol. It is true that the longer the habit is persisted in the shorter the duration of the hyperæmic state induced by each dose, and the stronger the craving therefore for its quick repetition; but it must be borne in mind that though the brains of habitual drinkers soon become anæmic if the seductive poison is withheld, the hyperæmic effects of each dose of it on the sympathetic ganglia and spinal cord are manifest during relatively long periods in the abnormal functioning of those organs. Now, if such be the case, the pains "that simulate neuralgia," or that "occur interchangeably with true neuralgia in the same person" in cases of chronic alcoholism, occur simultaneously with the hyperæmia of the sympathetic ganglia and of the spinal cord—a condition the exact reverse of that which Dr. Anstie alleges to be the condition precedent of neuralgia, but precisely the condition which I affirm to be a predisposing cause of the disease. That even in the most pronounced and chronic cases of alcoholic excess the condition just mentioned obtains is now proved in a manner which seems to be indisputable, and moreover it is proved not less indisputably that by reducing the hyperæmia in question the whole group of grave symptoms of alcoholic poisoning—delirium tremens included, is made to vanish. In the number of the *Practitioner* for January, 1869 there is a report of seven cases of delirium tremens treated successfully by means of the Spinal ice-bag. Two of these cases were treated by myself; three by Mr. Edward Hamilton, surgeon to St. Steeven's Hospital, Dublin; one by Dr. N. J. Butler, Dublin; and one by Dr. D. B. Hewitt, physician to the City of Dublin Hospital. In proof that lessening instead of increasing the amount of blood in the spinal cord, and in the sympathetic ganglia constitutes the curative process, I will repeat here the chief facts of Dr. Hewitt's case, and I may add that the action of the ice in the other cases was exemplified in a similar manner.

"James Mulholland, a strong muscular fellow of about forty-five years of age, was admitted into the hospital 25th February, 1868, in a most excited state: he shouted and kicked violently; talked to imaginary persons; and when, about two hours after, having taken beef-tea, milk, and a bolus containing twenty grains of capsicum, 'he fell into a disturbed sleep, it was broken by dreams

and phantoms of dogs, horses, soldiers, and spiders.' The next day he insisted that his belly had been cut open, and continued talking in a rapid, unconnected way. On the evening of the 28th, 'he became so violent that he frightened two male attendants to such a degree that they ran out of the ward. . . . During the night it was found necessary to restrain him by putting on the strait-waistcoat.' When admitted 'he was perspiring freely; his face and eyes were congested; his tongue moist and coated with creamy fur; his pulse was slow, full, but very compressible; and his hands were tremulous.' . . . On the 29th, says Dr. Hewitt, 'I found him pale, tremulous, sweating, with a cold clammy skin, and great exhaustion marked on his face. I ordered the strait-waistcoat to be removed, and found the pulse in the radial so rapid and indistinct, that it could not be counted: it was 116 in the femoral. . . . He imagined that he was surrounded by gold, and strove violently to prevent the attendants, at whom he shouted every few minutes, from getting any of it.' All the remedies tried having proved of no avail, and the patient having sunk into 'a much worse condition' than he was in on admission into the hospital, he was put to bed, and then an ice-bag was applied from the fourth cervical down to the upper lumbar spines. 'In a very short time after its application he fell asleep, and slept so soundly, that it was left on for more than two hours, when he awoke, took some beef-tea, and then fell asleep once more. In the evening I found him *free from the slightest trace of sweating; the surface was of a uniformly good temperature; the pulse had lost all its feebleness, and had become again slow, full, and regular; the face had acquired its natural colour and expression, and the tremens had greatly diminished. He had slept well all through the day.* From this period his recovery was complete; his appetite soon returned, and he was given a liberal diet without any stimulant. He slept for the greater part of three days, during which the ice-bag was applied thrice daily; he always found it strengthen him, and he said it made him feel as fresh as ever. . . . . On the 10th of March he was dismissed cured, and he has since been seen by Dr. Benson and myself, and has had no relapse.'" *

It seems to me that the experience gained in this case and in the other cases mentioned, proves decidedly that in cases of chronic alcoholism the spinal cord is not anæmic but hyperæmic, and, therefore, that the "so-called neuralgic form" of that disorder cannot be adduced in support of Dr. Anstie's theory.

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* Extracted from a Paper read before the Medical Society of the College of Physicians of Ireland, April, 13, 1868, and published in the *Med. Press and Circular*, April 22, 1868.

Dr. Anstie next remarks that "the occasional interchangeability of *migraine* with *epilepsy* is a well-known fact" (p. 119), and asserts that "neuralgias of the anterior part of the head are represented during the period of bodily development, and especially in the years just succeeding puberty, by migraine or by clavus" (p. 122). Bearing these reported facts in mind, and "reflecting further on the strong tendency which epilepsy likewise shows to infect the earlier years of sexual life," he says, "it is difficult to avoid the inference that both the epileptic and the neuralgic affections of this critical period of life are the expression of a morbid condition of the medulla oblongata, in which the sensory root of the trigeminus has its origin ; and further, that this morbid condition (tending to explosive and atactic manifestations of nerve force) must have its basis in defective nutrition. For, be it remembered, the epoch of sexual development is one in which an enormous addition is being made to the expenditure of vital energy ; besides the continuous processes of growth of the tissues and organs generally, the sexual apparatus, with its nervous supply, is making by its development heavy demands upon the nutritive powers of the organism : and it is scarcely possible but that portions of the nervous centres, not directly connected with it, should proportionally suffer in their nutrition, probably through defective blood supply. When we add to this the abnormal strain that is being put on the brain, in many cases, by a forcing plan of mental education, we shall perceive a source not merely of exhaustive expenditure of nervous power, but of secondary irritation of centres like the medulla oblongata that are probably already somewhat lowered in power of vital resistance, and proportionately irritable.

"Let us suppose, then, that to all these unfavourable conditions there was added the circumstance that the structure of the medulla oblongata, or of parts of it, was congenitally weak and imperfect, then surely it would be scarcely possible for these *loci minimæ resistentiæ* to escape being thrown into that state of weak and disorderly commotion which eminently favours pain in the sensory, and convulsion in the motor apparatus" (pp. 122-3).

The extent to which migraine and epilepsy are interchangeable, or represent each other in the same patient, and the extent to which neuralgias of the anterior part of the head are represented during the period of bodily development, by migraine or by clavus, may, perhaps, differ greatly in the practice of different physicians ; but though I have seen a good deal of these diseases, I confess that I have not been impressed with the facts here insisted on, and I cannot help thinking that more stress is laid upon them than they can rightly bear. The inference that "both the epileptic and the neuralgic affections [in question] of this critical period

of life [and, indeed, of any other period] are the expressions of a morbid condition of the medulla oblongata" is probably correct; but when Dr. Anstie says—"And further, that this morbid condition must have its basis *in defective nutrition*," I feel obliged to differ from him *in toto;* I must add, however, that I do so in company with Brown Séquard, Dr. Russell Reynolds, and, I am glad to be able to add, with my friend, Dr. Hughlings Jackson,* whose opinion will probably be thought to derive especial value from the fact that he formerly held the doctrine of Dr. Bland Radcliffe and Dr. Anstie in this matter, and that he has at length found, by the accurate observations for which he is especially distinguished, that he is compelled to abandon that doctrine. One of the arguments contained in the passage just quoted, viz., that in which the author contends that the development of the sexual organs superadded to "the continuous processes of growth of the tissues and organs generally," makes such "heavy demands upon the nutritive power of the organism," that portions of the nervous centres, and the medulla oblongata especially, though not directly connected with the sexual apparatus "proportionally suffer in their nutrition, probably through defective blood supply," strikes me as especially remarkable. Whatever is really known concerning the circulation in the medulla oblongata during the period of puberty and the immediately subsequent years, affords no countenance to this view; and the idea that owing to the development of the sexual apparatus, the medulla oblongata should so suffer in its nutrition as to become diseased, seems to me in the highest degree improbable. One would suppose that if, being extravagant in one direction, Nature were intent on practising economy in another, she would fix on the brain as a whole, the "defective blood supply" of which would result in an appreciable saving; for if the whole amount of nourishment needed by the medulla oblongata were withheld, the effect of its distribution throughout the rest of the organism would be too small to be in any degree perceptible. But we are precluded from entertaining this supposition, for Dr. Anstie expressly premises that in many of the cases supposed "an abnormal strain is being put on the brain by a forcing plan of mental education," which of course implies that it is receiving a full—indeed,

* See Dr. Jackson's careful and very informing "Study of Convulsions"—a pamphlet reprinted from the "Transactions of the St. Andrew's Medical Graduates' Association," Vol. III., 1870; also the *Lancet* for June 10, 1871, in which he is reported to have said at the Clinical Society that he supposes that the immediate cause of neuralgia, especially if it be paroxysmal, consists in "*discharges* of ganglion cells connected with *intact* fibres." This expression obviously implies neither atrophy nor any condition similar to it, but, on the contrary, excessive energy of the feeling cells.

an excessive—supply of blood. In short, while the hypothesis of "defective blood supply" in the medulla oblongata during the period of puberty is, I think, intrinsically improbable, and remains, after all Dr. Anstie has said, unsustained by any ascertained facts, much evidence might be adduced to show that during the period in question the blood supply of the medulla oblongata, so far from being niggardly, is, on the contrary, prone to be exuberant, and that during both childhood and youth the disorders of this nervous centre generally arise out of its superabundant nutrition.

The fact that certain mental influences often bring on neuralgia is regarded by Dr. Anstie as a powerful supporter of his doctrine. Having pointed out that the combination of the kind of "self-consciousness that is generated by an excessive spiritual introspection," with "the incessant toil of a life spent in sedentary brain-work, and chequered with many griefs which strike through the affections," is "sufficient of itself to generate the neuralgic disposition in its severest forms, without any hereditary neurotic influence, and without any other peripheral irritations," he seems to think it needless to prove that these influences operate, as he assumes them to do, viz., by depressing the circulation in the sensory nervous centres. This, however, is precisely the point which needs to be proved. I freely admit that at first sight the *modus operandi* of these influences on those centres does seem to be by depression, but that it is not really so becomes evident, I believe, when all the facts observable in such cases are duly considered. Dr. Anstie likens the effects of these influences, though slowly operative, to those of emotional *shock*, which, as generally admitted, "may produce almost any degree or variety of nervous disorder;" and he of course assumes in accordance with the general drift of his doctrines, that the effects in question are in both cases expressions of defective nutrition, and consequently also of defective vitality of the nervous centres. And, indeed, it is generally taught by pathologists that when "sudden emotional shock" causes disorder of the nervous system, it does so by inducing these conditions: if so, and if the physical effects of the mental influences in question are analogous to those of emotional shock, it is evident that the argument drawn from a consideration of the *modus operandi* of those influences affords very powerful support to Dr. Anstie's theory. I am, therefore, tempted to examine whether the basis of this argument is really of the nature which professional authorities assert it to be.

Shock is defined by Dr. Copland thus: "Sudden or instantaneous depression of organic, nervous, or vital power, often with more or less perturbation of body and mind, passing either into reaction, or into fatal sinking, occasioned by the nature, severity,

or extent of injury, or by an overwhelming moral calamity."* And the most recent writer on the subject, Mr. Le Gros Clark, expresses himself to the same effect: "The symptoms which collectively are named, or are characteristic of shock, are essentially those which denote that the centres, or sources of nerve force or energy are under the potent spell of some powerfully-depressing agent."† And he adds, "Mental emotion, apart from bodily hurt, may produce similar phenomena, varying likewise in their degree, in accordance with the exciting cause."‡ Now, as according to these eminent authorities, the phenomena of shock produced by mental emotion are essentially the same as those of shock produced by physical causes, I shall, in fact, be inquiring into the nature of what Dr. Anstie designates "sudden emotional shock," if I attempt a general investigation into the nature and causes of those phenomena which, by the common consent of recognised medical authorities, are held to be the chief symptoms of shock, however it may be induced.

In severe cases these symptoms are, according to Copland—"Feebleness, slowness, or irregularity of the pulse; coldness and pallor of the face, general surface, and extremities; a distressing feeling of sinking and anxiety; slow or irregular respiration; sometimes a cold perspiration, with general tremor; and a sunken or collapsed state of the countenance." In some cases nausea, vomiting, or singultus occurs. Most of these symptoms are undoubtedly forms of vital depression, for we know that when they are especially pronounced they are often the preludes of death. So far I share in the prevailing medical opinion on this subject; but at this point I find myself obliged to become a dissenter. I do not think, as is generally held, that the proximate cause of shock is, as stated by Dr. Copland, "depression of organic, nervous, or vital power;" or as Mr. Le Gros Clark says, "that the centres or sources of nerve force or energy are under the potent spell of some powerfully depressing agent." Neither of these authors, nor so far as I am aware, any others, have explained the mode of genesis of the symptoms in question on the hypothesis that the centres or sources of nerve-force are powerfully depressed, and I very much doubt if on that hypothesis it would be possible to offer any explanation which would bear the strain of logical examination, or would stand the test of comparison with the facts of Nature. But let us see how the several phenomena in question may be produced.

The symptoms which first impress the looker-on, are the general

* "Med. Dict," Vol. III, Part II, p. 785.

† "Lectures on the Principles of Surgical Diagnosis, especially in Relation to Shock and Visceral Lesions." By F. Le Gros Clark, F.R.C.S. London: 1870. P. 66.

‡ *Ibid*, p. 67.

pallor and coldness of the patient, and the sunken or collapsed state of the countenance. These symptoms are, I contend, produced by abnormally vigorous muscular contractions, which themselves are caused by an *excess* of stimulus delivered to them from the nervous centres functionally related to them. Every one who knows what is the main function of the great sympathetic nerve, knows that it is by virtue of force emanating from the ganglia of that nerve that arteries contract, and that when that force is excessive the peripheral ends of the arteries on which it is expended often contract even to closure. Now it is obvious that if these ganglia were in a state of tumultuous excitement, and were consequently to transmit an excessive amount of vaso-motor energy to all the arteries of the body, the blood would be so far shut off from the peripheral arteries as inevitably to produce the general and extreme pallor observable in cases of shock. When the blood is thus shut off from the surface of the body, it necessarily appears more or less shrunken, and this condition is especially notable in the face, because the face is especially vascular, and therefore affords the more scope for change. Moreover, the "sunken or collapsed state of the countenance" is increased by a certain amount of involuntary tonic contraction of the facial muscles, a condition denoting morbidly excessive energy in the medulla oblongata.

Assuming that the pallor incident to shock is actually produced as just described, we implicitly assume that textural nutrition all over the body is suddenly and greatly lessened. And if this be so, and if, as indeed is the case, the chief element of textural nutrition consists of chemical interchanges, processes always accompanied by an evolution of heat, it is manifest that the coldness incident to shock is due to the *excessive energy* of the vaso-motor nerve-centres, which, by lessening the blood supply, lessens the amount of textural and chemical change, and therefore the generation of animal heat. Moreover, inasmuch as the peripheral arteries are spasmodically closed more or less completely, and the starving textures throughout the body are therefore precluded from attracting blood to themselves, those copious draughts which, with suction force, are wont to be made on the vital current, are made no longer, and hence the blood streaming from the heart flows in its several channels with less impetus, and less rapidly than before, and the heart itself sharing in the general retardation, beats more slowly than when in health. But besides the disturbing influence on the heart here described, it is subject probably to abnormal force, transmitted to it through the cardiac nerves, which, when conveying excessively powerful currents of nerve-force, are capable of stopping the heart's action altogether. In this way the "feebleness, slowness, or irregularity of the pulse" may be completely accounted for.

The distressing feeling of sinking and anxiety is partly due, probably, to the impediment to the passage of the blood through the lungs, and is partly of directly cerebral origin. The arteries which supply the cerebrum are, like those distributed to the rest of the body, also under the constringing influenceof the excessively energetic sympathetic ganglia ; and when the cerebrum is partially deprived of its ordinarily full supply of food, great mental depression, or a feeling of sinking and anxiety, which may go to the extent of syncope, ensues.

When the normal function of the brain is interfered with, its great and constant normal influence on the lungs must be impaired ; and it is probable, therefore, that the slow or irregular respiration characteristic of shock is partly due to cerebral influence, and partly to the contracted state of the pulmonary vessels affected by the ganglia of the sympathetic.

The "general tremor" arises out of general excitement of the spinal cord, which is acting on a muscular system enormously enfeebled by being deprived of its usual supply of blood, by the general spasmodic arterial contractions already adverted to. Singultus is, I apprehend, produced in the same way.

Nausea and vomiting are certainly expressions of spinal hyperæmia. I have elsewhere so fully demonstrated the truth of this statement, that I need do no more than simply repeat it here.

I believe that I have now fairly shown that all the symptoms of shock are directly referable to tumultuous hyperæmia of the sympathetic ganglia, and of the spinal cord ; and in confirmation of this view I may add that I have proved experimentally that each of these symptoms can be made to disappear by reducing the hyperæmia of those nervous centres—a result obtainable by subjecting them to the *depressing* and prolonged influence of ice applied directly over them. It is evident that if ice thus applied produces the remedial effect here alleged, the symptoms in question must be due to hyperæmia of the spinal cord and sympathetic ganglia, and not to a contrary condition ; for if the latter condition obtained, it would not be lessened by the application of ice, but would, of course, and necessarily, be intensified.

Returning now to Dr. Anstie's argument that certain mental influences of the kind he mentions lessens the blood supply, nutrition, and vitality of the sensory nervous centres, and to his assumption that this argument is strengthened by a consideration of the analogy between the effects of emotional shock on the nervous system, and those of "the slower but far surer influence of long-continued mental habit," I venture to think that my readers will judge that that argument is shown to be groundless, and is confuted by the evidence here adduced.

Passing on "to the peripheral influences which, in a more

obvious manner, [than the mental habits above-mentioned] become factors in the production of neuralgia," Dr. Anstie affirms that "the only common quality that can be predicated of all is the tendency directly to depress the life of the sentient centre upon which their action impinges" (p. 126). This broad and remarkable assertion which, in my opinion, receives no countenance from either physiology or pathology, Dr. Anstie endeavours to support by several ingenious arguments, which I shall now consider. Vigourously defending the theory he has espoused, he very naturally gives especial heed and prominence to those peripheral influences which, *primâ facie*, seem to be certainly of a depressing kind; hence the stress he lays on mental influences, compared by him to those of shock; and hence his selection of "the agency of *cold*" as illustrative of "the external influences which contribute to the production of neuralgia." In proof that cold does not act as one of the "so-called 'exciting' causes" of neuralgia, but that it induces the disease by acting *on the sensory nervous centres*, in an exactly opposite manner, he says: "The continuous abstraction of heat from the surface, which of course is materially aided by rapid movement of the air, must necessitate a re-adjustment of the distribution of energy, the only result of which must be to drain the sensory nervous centre of its reserve of force. But, in fact, there is an experiment ready performed to our hands, which may amply satisfy us as to the kind of influence exerted by cold on superficial nerves, viz., the sensations experienced in recovering from frost-bite, which has been severe enough to paralyse the nerves, without causing actual gangrene of the tissues. The passage of the nerves back from temporary death to full functional life is marked by a half-way stage, in which there is agonising pain" (p. 127). I am constrained to say that this argument seems to me rather "far-fetched." Is it really credible that in such cases as those in question, the amount of cold to which the patients who have neuralgia induced by it are exposed, is capable of draining the sensory nervous centre of its reserve of force? Is it not more likely that one of the influences of such an amount of cold on the surface of the body is, by contracting the superficial blood-vessels, and, therefore, by lessening the surface circulation, to increase the amount of blood in the more central parts of the body generally, and therefore in the sensory nervous centres among the rest? Another influence of moderate cold on the nervous centres, and probably the chief one, consists, I apprehend, in making an *exciting* impression upon them, and thus in stimulating them to perform reflex actions, which become manifest in various directions. I know one case in which the use of a cold shower bath in winter was often followed by a rapid action of the bowels, the dejection being almost as fluid as the discharges constituting diarrhœa, a result

due, perhaps, in part to an afflux of blood inwardly, but due mainly, I believe, to a sudden stimulus of the nervous centres, resulting in reflex action on the mucous membrane and vermicular muscles of the intestines. I was informed, Dec. 19, 1871, by one of my patients, a woman about forty-five years old, that during the previous three days, each time she put her hands in cold water she had pain in the bowels, which was followed by dejections "quite like water." The motions occurred several times each day. On the morning when I last saw her, even the immersion of one hand in cold water produced a like but less powerful effect. A medical man, long resident in Yorkshire, and to whom I stated this fact, informed me that he has known cases of dairy-maids who being obliged, when making butter, to keep their hands for a considerable time in cold water, often suffered from diarrhœa, which is recognised as a consequence of doing so. These remarkable cases are, I feel assured, both indubitable examples of reflex action and manifestations of energy; and the view expressed above, and illustrated by these cases concerning the *modus operandi* of cold applied to the bodily surface in the manner in question receives confirmation from an interesting experiment by Brown Séquard, and his friend, Tholozan: they found that when one arm is immersed in cold water, the temperature of the opposite arm falls. Brown Séquard regards this as an example of reflex action of vaso-motor nerves. The impression made on the arm plunged in cold water is conveyed to the vaso-motor nerve centres, which, becoming excited, transmit their energy in various directions, and especially on the arteries of the opposite arm. But if this be the true explanation, and I believe it is, the cold in this case does not depress but stimulates the nervous centres in question. I have not repeated this experiment, but I can report a corresponding fact which goes far to prove it:* in some cases I have observed that when the feet of a patient are cold, and when warmth or friction is applied to one limb only, the temperature of the other rises. My explanation of this fact is,

* I am aware that the phenomenon reported by these observers does not invariably result when one hand is placed in cold water; but it does so sufficiently often when the experiment is performed under certain given conditions to justify, in my opinion, the conclusion that cold applied to one limb will cause vaso-motor reflex action perceptible in the corresponding limb. It must be admitted, however, as observed by Dr. Nunneley, that "this field of inquiry is so incompletely explored that we can well suppose the same end may be attained by different paths—that such changes of temperature may occur in some cases as the analogues of trifling rigors, in others by reflex agency." See Dr. Nunneley's report of his interesting and valuable experiments "On the Modifications produced in the Temperature of the Body by the Local Application of Cold and Heat," in the Fifty-fourth Volume of the "Medico-Chirurgical Transactions."

that in these cases the limbs were cold owing to the energetic contractions of their arteries which were unduly stimulated by the vaso-motor centres ; that the gentle, healthy influence of moderate warmth applied to one limb soothed the vaso-motor centres related to it, and that in consequence they ceased sending more than the normal amount of force to the arteries they govern.

Again, the majority of persons who walk out in *dry* frosty weather experience what, by common consent, is called—" a glow of health ;" this may be partly due to the fact, that when the air is cold and dry, more of it is inspired than is possible when it is not in this condition, and hence the blood receives a maximum amount of oxygen; but I believe the effect in question is also caused by the direct impression of the cold on the skin, and that this impression, transmitted to the nervous centres, acts as a *stimulus* upon them, and thus produces the healthy feeling experienced. The conclusion at which Dr. Anstie arrives from a consideration of " the sensations experienced in recovering from frost-bite " also seems to me an erroneous one. It is, in my opinion, impossible that, in the ordinary cases of frost-bite, the centripetal ends of the affected nerves are supplied with less blood, or with blood at a lower temperature, than normal ; and, whatever may be the action of the cold on their peripheral ends, it is certain that during the interval which commonly elapses between the action of the cold and the return of blood to the affected part, no such important structural change as that approaching to atrophy can occur. And if so, the phenomena of frost-bite do not tend, in any sense, to strengthen Dr. Anstie's theory ; but, on the contrary, when rightly interpreted, they tend, I believe, to weaken it. The action of the cold in arresting the circulation in the affected part, gradually deprives the peripheral ends of the nerves of blood, and therefore of the indispensable condition of sensation ; but during this process, and before the affected part is frozen, impressions made by the cold are transmitted to the sensory centres in question, for we are conscious of the action of cold on our bodies, and we can only become so through the medium of impressions from without. Now, the reception of impressions constitutes the function or active life of sensory centres, and the more impressions they receive, the more active or excited they become; therefore, so long as the peripheral ends of sensory nerves exposed to cold continue to be supplied with blood, that cold exerts an exciting influence on the sensory centres into which those nerves converge, and, as I maintain, produces hyperæmia, more or less prolonged, of those centres. But if it does this, it *may* act as an *exciting* cause, and *certainly* acts as a predisposing cause of neuralgia, and obviously when the blood returns to the frost-bitten structures, the tumultuous change

being effected in them, and notably in the sensory nervous filaments pervading them, cannot fail to result in the transmission of tumultuous impressions to the related sensory centres, which being predisposed, as just explained, to function with abnormal vigour, and, therefore, transcending the limits of normal sensation, produce the "agonizing pain" which is experienced in parts recovering from frost-bite. The view here expressed receives decisive confirmation from a consideration of the fact that, in cases of extensive burn, when the peripheral ends of the sensory nerves in the injured region are not merely paralysed, but actually destroyed, so powerfully *exciting* is the impression made on the sensory centres that it often induces intense reflex actions through the trophic nerves, resulting in extensive internal inflammation—most frequently of the intestines.

Referring to nerve-wounds as causes of neuralgia, Dr. Anstie asserts that the influence of such wounds, like that of cold, "must necessarily be a depressing one to the centre with which the wounded nerve is connected." The demonstration which I have just given of the *modus operandi* of cold applies, in great measure, to that of nerve-wounds, and as Dr. Anstie has adduced no evidence, and offers no argument in support of his assertion, it must, for the present, be accepted, if accepted at all, simply on his authority. Certainly, I am unacquainted with a single fact which even countenances it; but I know many which strongly discountenance it. At the moment a nerve is cut through, or lacerated, agonising pain is experienced; but this could scarcely be if a low degree of vitality were the condition most favourable for the genesis of pain, for it is well known that thoroughly healthy persons who sustain accidents by which nerves are wounded, experience agonizing pain immediately the accident occurs; and similar pain is felt when, owing to an accident, amputation is performed on a person who is constitutionally healthy. Dr. Anstie may perhaps remark that pain of this kind is not what he calls "true neuralgia," and, therefore, that the facts here mentioned are not relevant to the subject. But it does not seem to me that he has succeeded in tracing out a line of demarcation between neuralgia and other kinds of pain; and, if it is impossible, as I believe it is, to trace any such line, then probably those facts are relevant to the subject.

"The pain" caused by nerve-wounds "is set up," says Dr. Anstie, "during the process of nerve-*healing;* that is to say, at a stage intermediate between those of *abolished* function and *completely restored* function." If these words mean that so long as a neuralgia originated by a nerve-wound continues the wound is not completely healed, then the meaning originally attached to the word "heal" is no longer conveyed by it when Dr. Anstie

uses it ; for nerves which have been wounded have, so far as the eye can discern, become completely healed, and yet the neuralgia induced by the wounds persists. The words just quoted seem to suggest, however, that he thinks our present powers of observation inadequate to determine, by an examination of nerve-structure, whether a nerve which has been wounded be really healed or not, and that we can only be assured that such a nerve is really healed when we are assured that it has recovered "its full functional activity." Whether or not this has been recovered may be determined, we learn, by ascertaining whether or not the pain has ceased ; for, says Dr. Anstie, "when once the full functional activity is completely restored there is an end of neuralgic pain." This is one of those ingenious statements which is alike incapable of proof and of disproof. I can only observe that to me it seems incredible : when a physiological habit has once been engendered, it is peculiarly prone to persist long after the cause of it has been removed, and in many cases, indeed, its abolition is astonishingly difficult ; it is, therefore, to be expected that the physiological change in structure and function of a sensory nerve-centre, wrought in it by the irritation of a wound in the nerve related to it, and productive of pain, will persist after the wound is thoroughly healed. This state of things is especially exemplified in certain cases of dental neuralgia, in which, through caries, or some other dental disorder, the dental nerve becomes the seat of chronic irritation ; pain is experienced, its recurrence becomes a habit, and then, though the offending tooth be extracted, the habit often persists for a considerable time—long, indeed, as I believe, and as experienced dentists believe—after all local disorder is completely abolished, and after the peripheral end of the nerve is completely healed.

That the influence on the nerve-centre of a nerve-wound is not one productive of anæmia or depression might be inferred, one would think, from considering the nature of those extraordinarily painful swellings of the ends of nerves left in stumps after amputation. That those swellings are due to inflammation, or, as Dr. Anstie terms it, "a process of hyperplastic changes in the nerve-fibres," there is no doubt ; and, according to the general view of the subject by the profession, as well as the suggestions of common sense, the inflammation is associated with an intense excitement or excitability of the nerve at the point where it was divided, and this condition is propagated to the sensory centre, with which it is connected, and thus causes the pain. Dr. Anstie gives no hint how this condition of the peripheral end of the nerve becomes causative of anæmia, depression, and defective nutrition at its centripetal end, and I presume he finds it difficult to do so ; for, after intimating that neuromata very rarely produce neuralgia,

whereas he thinks they ought to do so very often if it is producible by peripheral influence, he merely says,—"I do not know how the facts may affect the reader, but to me they suggest the strongest possible arguments against the belief that peripheral irritation can of itself produce neuralgia without the intervention of some centric change." He adds,—"The same remarks apply to the result of observations on the effects of tumours, commencing in tissues altogether unconnected with the nerve, and merely coming to involve it, secondarily, in pressure" (p. 129). But this is not the question at issue: it is generally admitted, I believe, by neuro-pathologists that, in the majority of cases, at all events, neuralgia is produced by the co-operation of a predisposing with an exciting cause of the disease, and the question is,—what is the *modus operandi* of the exciting cause or "peripheral irritation" in such cases? Dr. Anstie asserts that it consists in lessening the vitality of the sensory centre with which the affected nerve is connected; but nowhere in his book is there to be found an explanation of the successive steps by which such "peripheral irritation" can directly induce centric anæmia, or a proof that it ever does so.

The great influence of a theory in shaping our judgment respecting the relative value and the significance of facts has often been matter of astonishment, and, as it seems to me, Dr. Anstie's pages exemplify this influence in a remarkable degree: peripheral agents conducing to originate neuralgia are, as a class, insurgents against his theory, and are therefore discredited or degraded to the lowest possible rank in the scale of causes. For example, he says,—"It is not at all common—it is even *exceedingly rare*—for irritation conveyed from the alimentary canal to take any important part in setting up neuralgia of a distant nerve" (p. 130). But any agent which even seems to act by way of depression, though it does not really do so on the nervous centres themselves, is singled out for especial distinction, and hence this passage,—"In fact, however, there are certain peculiar forms of gastric irritation which *do* react upon the trigeminus; for instance, a lump of unmelted *ice*, suddenly swallowed, almost invariably [!] produces acute pain in the supra-orbital branch of the fifth, on one side or the other and occasionally (as in a case cited by Sir Thomas Watson) in other nerves" (p. 130).

At length, however, in the course of his etiological review, a group of agents come before him, the irritant or excitant influence of which he is constrained to recognise: "In a large number of cases," he says, "irritations proceeding from the genito-urinary organs do undoubtedly contribute to the production of neuralgia, though," he is careful to add, "by no means in the important degree which many authors seem to have assumed." Again he

says,—"Of the power of irritation of the external genitalia to act as a so-called 'exciting cause' of neuralgia there is abundant evidence. I would especially call attention to the remarkable monograph of M. Mauriac,* on the neuralgias consecutive to blenorrhagic orchi-epididymitis, as illustrating this with a force that was to me, for one, surprising" (p. 132). Dr. Anstie also mentions with especial emphasis "the peripheral irritation produced by masturbation," by "functional abuse of the eye," and by "caries of the teeth," as well as by "the comparatively rare accident of the malposition or abnormal growth of a 'wisdom-tooth'" as powerfully conducive to the development of neuralgia. But while describing these several forms of peripheral irritation, he sheds no light on their mode of action, and the reader is left to infer that the words with which he opens his discussion of the "peripheral influences," viz., "the only common quality that can be predicated of all is the tendency to depress the life of the sentient centre upon which their action impinges," do in fact apply to all alike. In a subsequent part of the chapter under discussion there is to be found, however, an express recognition of exceptions to the general principle laid down in those words —exceptions so important, indeed, as virtually to nullify that principle.

As already stated, the atrophy with which Dr. Anstie maintains that the sensory centre is affected in cases of neuralgia is, he says, "usually of non-inflammatory origin;" but he adds (at p. 157),—"It is probable, however, that in a certain number of cases the atrophic stage may be preceded by a process of genuine *inflammation*, and that this inflammation is centripetally produced in consequence of inflammations of peripheral portions of the nerve." Again he says,—"Taking everything into consideration, one is inclined to say that there is a probability that in a very limited number of cases peripheral irritation does cause actual myelitis, which escapes recognition at the time, but which issues in an atrophy, the subjective expression of which is actual neuralgic pain."

The concession contained in these two sentences, viz., that peripheral irritation does, in fact, produce inflammation of the spinal cord in a certain number of cases implies that peripheral irritation can and does, in such cases, at all events, produce a result of a nature directly opposite to that which Dr. Anstie affirms to be its consequence as a general rule. He gives no explanation of how it comes to pass that a cause which, though one

* "Etude sur les Névralgies Réflexes Symptomatiques de l'Orchi-epididymite Blenorrhagique." Par C. Mauriac, Medicin de l'Hôpital du Midi. Paris: 1870.

and the same, and the *modus operandi* of which is identical in both sets of cases, should nevertheless induce, directly and immediately, inflammation in one group of spinal cords, and atrophy in the other. I venture to predict that no satisfactory explanation will ever be forthcoming, and for the simple reason that, in my opinion, experience proves that causes of the same nature, operating in the same way, on structures of similar character, do not and cannot produce results differing *essentially* from each other in different cases. They may differ widely in degree, but they cannot differ in kind. In confirmation of this remark, as of the general doctrine which I hold concerning the *modus operandi* and effects on the spinal cord of peripheral irritation, I must add here what seems to me a very important observation. Dr. Anstie adduces no single case of neuralgia in which *post-mortem* examination has revealed that without the intervention of inflammation peripheral irritation has caused atrophy of the posterior root, or sensory centre of the affected nerve: indeed, he has adduced no case of what he calls true neuralgia in which atrophy of those parts, however produced, was observable. Therefore, the doctrine that atrophy of those parts is the proximate cause of neuralgia, and that when peripheral irritation either produces the disease or aids in its production, it does so in the great majority of cases by *directly* inducing the atrophy in question, is a pure hypothesis, and one, so far as I am able to discern, without any physiological or pathological fact to sustain it. On the other hand, the doctrine that peripheral irritation may produce hyperæmia, or vascular excitement of the spinal cord, involving such exaltation of its textural nutrition as actually to culminate in inflammation, reposes on authentic clinical facts, verified by *post-mortem* examination and physiological experiments —facts which constrain Dr. Anstie himself to make the notable concession just quoted.

Turning now to another aspect of the subject, I must remark that I very much doubt the existence of any evidence proving that actual inflammation of the spinal cord, issuing in atrophy of its inflamed parts, is ever so disassociated from its usual symptoms as to escape recognition if, at the time, the patient is under the care of a duly educated medical man; and my doubt is much strengthened by a consideration of the symptoms of the only form of disease in which pain of a neuralgic character and atrophy of both the sensory centres and of the posterior roots of the spinal nerves are known to coexist, viz., locomotor-ataxy. I have already adduced evidence to show that the initial stage of this disease is an inflammatory one, and that the sub-acute or smouldering inflammation is followed by partial or complete death (atrophy) of the parts successively attacked; and I may observe

that, in a large number of cases, evidence exists justifying the conclusion that the disease was originated by assignable peripheral causes.

Now, according to Dr. Anstie's doctrine, the pain characteristic of locomotor-ataxy ought not to be experienced until the nervous centres, or nerve-roots, in question, become in some degree atrophied, and those pains ought to become increasingly severe as the atrophy proceeds, until at length complete death of the affected parts puts an end to the pains altogether. In other words, the hyperæmic or inflammatory stage ought to be painless, and if it were so it might, as he suggests, very easily "escape recognition at the time." But the actual facts are far otherwise. The symptoms of the disease during its onset do not consist of any impairment of sensation, or of any lack of power of co-ordinating muscular movements, and therefore do not denote any degree of atrophy of sensory nerve centres ; but as a general rule the first stage of the malady is characterised either exclusively or chiefly by pains; and according to the observations of Dr. Lockart Clarke, to whom I am indebted for his opinion expressly on this point, the pains are more severe during that stage than subsequently, when the disease is fully developed. I am warranted, therefore in saying, that whereas a consideration of the phenomena of locomotor-ataxy, on which Dr. Anstie lays especial stress as confirmatory of his pathology of neuralgia, shows that they are irreconcilably at variance with it, they are in perfect harmony with, and are completely accounted for by, the hypothesis that some grade of hyperæmia of the sensory nervous centre affected is the proximate cause or "chief material element" of neuralgia.

A pathology of neuralgia can scarcely be considered acceptable by competent and impartial judges, unless it affords a rational explanation not only of the proximate cause of the pain, but also of all the other morbid phenomena, known as the complications of neuralgia, and some of which are associated with it in almost every case. Having reviewed the main facts and arguments relied on by Dr. Anstie in support of his doctrine, that the proximate cause of neuralgia itself consists in atrophy of the posterior root of the affected nerve, I will now glance at his explanation of the numerous and very diverse phenomena, the production of which I have accounted for in Chapter III., and which he has well described in his chapter entitled,—"Complications of Neuralgia."

"Convulsive actions of muscles," and "tonic spasms of various portions of the alimentary canal," Dr. Anstie ranks among the complications ; but he makes no attempt even to show *how* these phenomena are produced by nervous centres which are the seat

of defective nutrition. He merely says (at page 123) that this condition "eminently favours convulsion in the motor apparatus." He offers neither facts nor arguments in support of this doctrine, and I therefore shall only say of it here that it is a doctrine which, though ingeniously elaborated by Dr. Bland Radcliffe, is exactly the reverse of that generally taught by English and Continental physiologists, and that it is discredited by a vast crowd of indubitable facts.

Paralyses of muscles Dr. Anstie found in twenty-eight cases out of a hundred. Referring to sciatica he says,—"It is necessary to bear in mind, in prolonged cases, the probability that much of the weakness may have been caused by degeneration of the muscles, owing to forced inaction. Still, there is a class of secondary paralyses that are in no way to be confounded with such effects as these." He gives, however, no intimation *how* these paralyses are produced. This omission seems to me especially to be regretted, because, as matters stand in his book, the reader is left no alternative but to infer that those conditions of muscle which seemingly are the exact reverse of each other, viz., paralysis on the one hand, and convulsion or spasm on the other, are due to one and the same proximate cause—defective nutrition of the motor-nerve centres connected with the affected muscles. I have given a good deal of attention to the subject, and this is the only conclusion I can draw from the premises.

Hyperæsthesia of the surface "only occurred in the later stages of the disease," says Dr. Anstie (p. 92), when recounting Notta's experiences; and again he remarks (p. 108) that in the later stages impairment of common sensation "is supplanted in part by great tenderness on pressure in the well known *points douloureux*, and sometimes the tenderness becomes diffused over a considerable surface." Respecting the proximate cause of these phenomena, Dr. Anstie says, the so-called *points douloureux* are themselves pretty certainly, for the most part, a phenomenon of vaso-motor palsy, and the more widely diffused soreness, such as remains in the scalp—for instance, after the attacks of pain even at the earlier stage of the trigeminal neuralgia, than that in which permanently tender spots are formed, are probably entirely due to a temporary skin congestion" (p. 93). As Dr. Anstie maintains that "pain is not a true hyperæsthesia," he cannot consistently admit the existence of what he calls "*true* hyperæsthesia" in a region affected with neuralgia, and therefore when "great tenderness on pressure," or "widely diffused soreness" over the neuralgic area obtains, he regards it as "for the most part a phenomenon of vaso-motor palsy." But I have many times observed hyperæsthesia within the neuralgic area, when that area was in no perceptible degree hyperæmic. Moreover, the testimony of numerous and

thoroughly creditable observers proves indisputably, I think, that exaltation of sensibility of the neuralgic region of a kind differing from the tenderness on pressure, or diffused soreness accompanying local congestion or inflammation, occurs in a considerable proportion of cases. Indeed, the frequency with which it presents itself causes it to be regarded as a characteristic symptom. Though Dr. Downing's pathology of neuralgia may not be of much value, his observations of facts are, I presume, as reliable as are those of other writers on the disease, and he says the neuralgic parts "have such exquisite sensibility, such increased excitability in most cases, that it is more difficult to say what will not, than what will, bring on the neuralgic action. The patient cannot bear the slightest touch or movement of the part. The titillation of a feather, or a breath of air on the spot, will often excite excruciating torment."* Dr. Copland asserts that among the phenomena observable as accompaniments of the pain, and "especially during its greatest intensity," is "*general exaltation of sensibility.*"† Sir Charles Bell relates a remarkable case (No. 91) of a gentleman suffering from dorsal neuralgia associated with intense hyperæsthesia. "The pain extended over the whole of his back, and on both sides equally. A gentle touch of the finger on the skin at once caused a paroxysm, and he writhed and stamped from the intense agony."‡ Referring to facial neuralgia, Romberg says—"The paroxysm is made up of small attacks, and recurs at regular intervals. The more frequent its renewal, the longer the disease lasts, *the more sensitive* the affected side of the face becomes to gentle, unexpected, or superficial contact, which generally gives rise to an immediate and violent accession of pain."§ Trousseau, in his description of one of his cases, says,—"I found extreme exaltation of cutaneous sensibility over the parts to which was distributed the anterior extremity of the two affected intercostal nerves," and he insists strongly on "the importance of this hyperæsthesia as a symptom."‖ Dr. Lockart Clarke states that "in non-inflammatory neuralgia, the pain may be excited or aggravated by the slightest touch."¶ In presence of such testimony as this, it is difficult, as it seems to me, to ignore hyperæsthesia unassociated with congestion as a complication of

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* "Neuralgia : Its Various Forms, Pathology, and Treatment." London : 1840. P. 8.

† "Medical Dictionary." Vol. II. P. 876.

‡ "The Nervous System of the Human Body." Third edition. P. 369.

§ "The Nervous Diseases of Man." Vol. I. P. 32.

‖ "Lectures on Clinical Medicine." Trans. by P. V. Bazire, M.D. Part II. Pp. 484-5.

¶ "Nerve Lesions, and their more Immediate Effects." Article in Holme's "System of Surgery." Vol. IV. P. 173.

neuralgia, and yet Dr. Anstie does not recognise it, and of course, therefore, he gives no explanation of its presence.

Les points douloureux and "*the more widely diffused soreness*, such as remains in the scalp, for instance, after attacks of pain even at an earlier stage of trigeminal neuralgia than that in which permanently tender points are formed, are probably entirely due," says Dr. Anstie, "to a temporary skin congestion" (p. 93). But if, as he asserts, "pain involves a lowering of true function" in the sensory nerve affected, how can congestion of the surface over which its peripheral branches spread heighten its functions beyond the normal degree? If prior to the alleged vaso-motor palsy the "true function" of the nerve in question were not lowered it would not be difficult to understand how when its peripheral branches receive an extraordinary supply of blood its functional power, and therefore the sensitiveness of the neuralgic region, should be increased. But Dr. Anstie says the "true function" is lowered: if it is, and if, as I presume he admits, the perception of the pain at the *points douloureux*, and of the diffused soreness is by the agency of the affected sensory nerve, its "true function" though lowered, as alleged, by the neuralgia, is really lowered very little, seeing that it can be raised again, when its peripheral ends receive an extraordinary amount of blood by means of vaso-motor palsy, so high as to present that form of hyperæsthesia consisting of the consciousness of *points douloureux*, and of the diffused soreness in question. These considerations go far, I think, to prove that the vitality and functional power of the nerve are not lowered at all. And I must now add that, so far as my knowledge extends, neither vivisectional experiments on animals, nor pathological observations of man, justify the assertion that mere vaso-motor palsy is capable of producing the sensation of either the *point douloureux*, or the diffused soreness in question.

Anæsthesia as a complication of neuralgia, seems especially accordant with Dr. Anstie's theory. He says,—"*Common sensation* was reported by Notta as affected in only three cases out of 120, but my own experience has afforded a much larger proportion of instances in trigeminal neuralgia. Indeed, in all situations, neuralgia appears to me to involve this effect, in the larger number of instances, *in the early stages*" (p. 108). Referring to this symptom he afterwards says,—"When we observe a patient suffering from racking supra-orbital and ocular neuralgia, and discover that at the very same period the skin round the eye is markedly insensitive to impressions, except in the *points douloureux*, what *can* we rationally suppose, except that both pain and insensibility are the result of one and the same influence [viz., atrophy, or defective nutrition] which radiates from the sensory centre?" But referring to the evidence adduced above, I might ask with equal

reason,—when we observe the combination of racking neuralgia with marked exaltation of sensation in the neuralgic area, what *can* we rationally suppose, except that both pain and hyperæsthesia are the result of one and the same influence, which radiates from the sensory centre, and that that influence is produced by excessive nutrition of that centre? It is obvious, however, that neither of these hypotheses can account for the existence of both anæsthesia and hyperæsthesia as complications of neuralgia. Seeing how the existence of anæsthesia complies with the requirements of Dr. Anstie's hypothesis, it is easy to understand how he should avail himself of it in the emphatic way he does; but it is not so easy to understand how he can ignore so completely as he does the complicating hyperæsthesia, the existence of which that hypothesis wholly fails to explain.

Excessive Secretion.—Dr. Anstie mentions as complications of neuralgia, lachrymation, flux from the nostrils, and unilateral sweating. He might have added an extraordinary flow of saliva, broncorrhœa, diarrhœa, an abnormal abundance of (pale) urine, leucorrhœa, and even seminal emissions. He says,—"The phenomena on the side of *secretion* might indeed be possibly explained by vaso-motor paralysis, consisting as they do in the great majority of cases of a mere outpour of what seems little more than the aqueous part of the secretion, and in a few cases of arrested secretion, a phenomenon by no means unfamiliar as the result of sudden passive engorgment of glands" (p. 153). That the fluid passing from the glands in these cases is not a true secretion, but a mere passive exudation is neither proved nor shown to be probable by Dr. Anstie. I venture to say that all existing evidence bearing on the subject tends to demonstrate that the "out-pour" in these cases is a genuine secretion; and I cannot help thinking that if, bearing in mind the requirements of his theory on one side, viz., that glands when affected at all in cases of neuralgia ought to be paralyzed rather than abnormally vigourous, and recognising the actual facts on the other, viz., that they pour out their peculiar products superabundantly, Dr. Anstie had not found himself in a scientific dilemma, he would not have originated the hypothesis that the phenomena on the side of secretion are of a merely passive character. To prove that the tears which in many cases flow profusely during an attack of facial neuralgia contain a greater proportion of water than the tears shed during mental emotion, that the flux from the nostrils occurring during a like attack, is more dilute than is that often accompanying the onset of catarrh, and that the unilateral sweat, which is sometimes a notable complication of neuralgia, differs in character from ordinary normal sweat would, I feel assured, be impossible. It is true that in many cases of renal neuralgia, the urine voided is of remarkably low specific

gravity, but this fact, instead of proving the feebleness of action of the kidneys, constitutes strong evidence, as I have shown at page 101, that they are functioning with preternatural vigour. I incline to believe, however, that Dr. Anstie is quite conscious that his explanation of "the phenomena on the side of secretion" is questionable and unsatisfactory, for his language is peculiarly guarded and cautious. He says these phenomena "*might, indeed be possibly explained* [he carefully avoids saying they *are explicable*] by vaso-motor paralysis," and the sentence following the one containing these words, and to which I shall presently advert, shows that he has strong misgivings as to the correctness of his explanation.

Disorders of Local Nutrition—Having stated that he is "inclined to explain" all the congestive complications "on the basis of vaso-motor paralysis," and that "the phenomena on the side of *secretion* might indeed be possibly explained" on the same basis, Dr. Anstie next turns his attention to the "trophic phenomena" which constitute some of the most notable complications of neuralgia, viz., inflammations of different structures, disordered nutrition of the skin and mucous membrane, changes in the colour of the hair and in the size and texture of the individual hairs, abnormal and excessive growths of hair, herpes zoster, unilateral hypertrophy, &c., &c. When he applies his theory in order to explain these phenomena it breaks down so completely that he himself is obliged to abandon it—temporarily, at all events, as he virtually informs his readers in the following words:—"But the mere cessation of vaso-motion will not account for such facts as the *rapid and simultaneous* development of erysipelatous inflammation, of corneal clouding and ulceration, or iritis and glaucoma, of nutrition changes in hair and mucous membrane. I must for the present be content to believe it probable that there is a special set of efferent fibres in the trigeminus, emanating from the motor root, whose office it is in some unknown way to preside over the equilibrium of molecular forces in the tissues to which the nerve is distributed; trophic nerves, in fact" (p. 153). In other words—*motor* nerves, or, as Dr. Anstie says, "fibres emanating from the *motor* root." So that at last he finds himself compelled to recognise that the most numerous and most characteristic group of neuralgic complications are explicable, and only explicable, not by the absence, but by the presence of nerve-force, and not by its presence merely, but also by its excess or its excessive action. And I must add that preternatural energy of trophic nerves denotes *excessive*, and not defective, nutrition of trophic nerve-centres. Now, I ask, is it likely that when they are in this state of excessive nutrition the neighbouring sensory nerve-centres are

in an opposite state, viz., that of "defective nutrition"? It is a well-established fact that any given condition of circulation and nutrition obtaining at any given point tends to extend itself to the immediately surrounding structures. Therefore if the sensory centre of a neuralgic nerve is in a state of atrophy it ought to propagate that state to its neighbouring trophic centres, and, consequently, the nutritive processes within the neuralgic area ought to decline as the neuralgia increases; but, as a matter of fact, these processes become increasingly excessive as the neuralgia increases. It seems to me difficult, therefore, to avoid the conclusion, even from a consideration of the trophic phenomena of neuralgia alone, that inasmuch as the trophic nerve-centres in question are in a state of excessive nutrition, the neighbouring centres with which sensory roots of neuralgic nerves are connected must be in a state of excessive nutrition likewise.

I have now examined carefully, and, I hope, completely and impartially, all the main facts and arguments which are adduced by Dr. Anstie in support of his doctrine that the phenomena of neuralgia are expressions of defective nutrition involving lowered vitality of the nervous centres affected, and, notably, of atrophy of the posterior root and sensory centre of the neuralgic nerve—facts and arguments which, if admissible and reliable for the purpose intended, invalidate to a corresponding extent the pathology and etiology of neuralgia which it is the object of this volume to expound and advocate. The result of my examination may be summed up as follows :—

In no case of "true neuralgia," in which a *post-mortem* examination has been made, has evidence been presented of atrophy of the sensory nervous centre or of the posterior root of the affected nerve. The history of the symptoms, and the *post-mortem* phenomena of locomotor ataxy, discredit Dr. Anstie's statement that this disease "is from first to last an atrophic affection," and constitute very strong evidence that its initial stage is an inflammatory one, that the pains characteristic of the disease are immediately due to the hyperæmic condition which terminates in inflammation, and that, as a rule, they are the first symptoms of the disease because inflammation of the sensory nerve centres is the precursor and cause of the atrophy with which those centres finally become affected.

The pains occasionally felt by sufferers from spinal paralysis afford no proof of Dr. Anstie's doctrine, for there are good reasons for believing that that disease is associated with some grade of inflammation or undue afflux of blood in the affected part of the spinal cord. The same remark applies to the pains

experienced in cases of chronic alcoholism, for those pains occur, as I have shown, simultaneously with the presence of hyperæmia in the cord, and in the sympathetic ganglia also. Dr. Anstie offers no proofs that both the epileptic and neuralgic affections occurring during the years just succeeding puberty are expressions of defective nutrition of the medulla oblongata, and his argument in support of the supposition that they are so—a supposition which is opposed to the conviction of almost every neuro-pathologist in Europe, seems to me especially far-fetched and unsatisfactory. Though "the incessant toil of a life spent in sedentary brain-work, and chequered with many anxieties and many griefs which strike through the affections," may "generate the neuralgic disposition in its severest form," and though the influence of such a life undoubtedly impairs the vitality of the organism as a whole, yet, as has been shown, the spinal cord and sympathetic ganglia, even in these cases, as in cases of shock, are actually hyperæmic, and therefore in a state exactly the reverse of that alleged by Dr. Anstie to constitute the proximate cause of neuralgia. Precisely the same remark is applicable to the influence of cold; and indeed, I have, I believe, clearly shown that Dr. Anstie's statement that "the only common quality that can be predicated of all" peripheral influences, which "become factors in the production of neuralgia," is not, as he alleges, "the tendency directly to depress the life of the sentient centre upon which their action impinges," but, on the contrary, to increase and intensify it.

Unsupported either by physiological or pathological facts, Dr. Anstie's pathology and etiology of neuralgia are proved incapable, when closely examined, of supplying a rational and consistent explanation of the proximate cause and mode of production of pain—an explanation at once co-extensive and accordant with all the facts of the case; but, however inadequate they are to solve the problem—what is the structural change in the sensory nervous centre constituting the indispensable condition precedent of pain? they are found to be even still more at fault when used as a means of explanation of the "complications of neuralgia." According to his hypothesis, if I interpret his language rightly, those notoriously opposite states—convulsion and spasm on the one hand, and paralysis on the other, are alike produced by one and the same proximate cause, viz., structural degeneration of the motor centres in question.

The condition commonly denoted by the term hyperæsthesia, and declared by the majority of competent observers to be a characteristic complication of neuralgia, is a condition the existence of which cannot be accounted for at all by Dr. Anstie's hypothesis, and, indeed, is ignored; while the *points douloureux*, and the diffused tenderness or soreness of the neuralgic region,

often observable, are unintelligible as results of mere vaso-motor palsy, if, as Dr. Anstie asserts, the sensory function of the feeling nerve is already "lowered," or more or less abolished. His assertion that the phenomena of secretion consist "in the great majority of cases of a mere outpour of what seems little more than the aqueous part of the secretion," is not confirmed by observation, and if these outpours are products of real secretory action of the glands, from which they come, they alone constitute an insuperable objection to Dr. Anstie's hypothesis, with which their existence is wholly irreconcilable. But, indeed, by carefully limiting his remark to "the great majority of cases," he shows he is keenly alive to this difficulty ; and, finally, constrained as he is by the irresistible force of facts which can be neither ignored nor explained away, to recognise that, at least in certain cases, neuralgia originates in inflammation of the spinal cord, induced by the *exciting* action of certain peripheral influences, and that the most numerous and most characteristic group of neuralgic complications, the "trophic phenomena," are alone explicable by assuming the presence, and not the absence, of nerve force, and its presence moreover in excess of the normal amount, he by this recognition, implicitly and virtually abandons his hypothesis altogether.

In closing this review of Dr. Anstie's arguments in support of his hypothesis, I must observe that I am not unmindful of the condition which he imposes on his reader : he claims for his view, he says, "that the whole argument shall be taken together, for it is a case of cumulative proof; every link must be weighed and tested before the strength of the chain can be felt" (p. 163). I believe I have carefully examined every link—the strongest as well as the weakest—and my deliberate conclusion is, that if each of the weakest links were thrown away, the remainder of the chain, instead of possessing "the remarkable strength" ascribed to the whole of it by its maker, is demonstrably incapable of sustaining the doctrine in question. If in arriving at this conclusion I stood alone, I might perhaps fairly distrust my own judgment ; but it is confirmed by an authority, to whom Dr. Anstie himself manifests deservedly great deference, viz., Eulenberg, who, referring to the existence of hereditary neuroses, says,—"The definition, however, by means of which attempts have been made to express the nature of such congenital anomalies, and especially with reference to the origin of neuralgias, are for the present, almost altogether without the support of facts. This is the case with the theory strenuously advocated recently by Anstie." Adverting to the chief peripheral influences which Dr. Anstie supposes to operate injuriously on the alleged "congenital *locus minoris resistentiæ*," Eulenberg says,—"The influence of all these

momenta upon the production of neuralgia consists in this, according to Anstie, that the cells and fibres, originally constructed only imperfectly, are brought into a positively morbid state, which ends in pronounced atrophy. Anstie, however, supplies no proofs whatever of this assertion; for the facts which he adduces show only the probability of a congenital predisposition generally, but not that of a process which, in neuralgias, leads to an atrophy of the sensory roots, and of the parts of the spinal cord into which they are implanted."*

Seeing how thoroughly my own estimate of the value of Dr. Anstie's "cumulative proof" of his theory is endorsed by this eminent German neuro-pathologist, my readers will admit, I think, that at all events, neither that theory, nor the arguments hitherto advanced in support of it, can in any degree invalidate, even implicitly, the doctrine advocated in this volume.

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* "Lehrbuch der Functionellen Nervenkrankheiten," p. 52. Eulenberg's judgment cited in the text, was pronounced on Dr. Anstie's views, as set forth in his article on "Neuralgia," published in Reynold's "System of Medicine;" and, perhaps, Dr. Anstie will deny the applicability of that judgment to his views as subsequently elaborated and expounded in his recently published volume; for, in his preface to that volume, he says,— "It became necessary to completely re-cast the chapters on 'Pathology,' and on 'Complications,' on account of some of the polite criticisms which Dr. Eulenberg directed (in his recent 'Lehrbuch der Nervenkrankheiten') to my argument in the article above referred to, since it was obvious that a too brief statement of my views had caused them to be partially misunderstood by the German physician." But I do not think that Dr. Eulenberg will admit the justice of the imputation that he has "partially misunderstood" Dr. Anstie's views: any one who has made himself thoroughly acquainted with them as they are expounded in Dr. Anstie's recently published volume, and who then reads Eulenberg's description of them as gathered by him from the article in question, will, I believe, be impressed with the conviction that that description represents those views as expounded, not only in the article, but in the volume itself, with remarkable fidelity, and therefore that the judgment of them quoted in the text applies as strictly to them in the one case as in the other.

CHAPTER XII.

DIAGNOSIS AND PROGNOSIS.

Concerning *diagnosis* I have but little to say; for, though this work is avowedly on neuralgia, yet the general drift of all I have said concerning the essential nature or proximate cause of pain implies that there is no real or fundamental distinction between that kind of pain commonly called neuralgia and any other of the various kinds of physical pain. If in the preceding pages I have made any considerable approach to the achievement of the task laid upon myself, they present valid reasons for the generalisation expressed at the end of Chapter XI., viz., that just as all the various neuralgias are merely different kinds of pain, even so every kind of pain is a form of neuralgia; or, in other words, that the name "neuralgia," and the more "generic" word "pain," are really, in respect to the pathological state of the sensory nervous centre in question in any given case, mutually convertible terms, and denote one and the same thing. I believe there is no exception to the truth of this statement; for there are good reasons for affirming that the mechanism and mode of production of cerebral pain are analogous to the mechanism and mode of production of all other kinds of pain; that, in fact, the brain is pervaded by sensory fibres which have their roots in the sensory ganglia at its base; that cerebral pain or headache may, like any of the ordinarily recognised neuralgias, have either a centric or a peripheral origin (the sensory ganglia being the centre, and the grey matter of the cerebrum the periphery), and that, therefore, every kind of headache is as completely and essentially a neuralgia as is the classical *tic douloureux* itself.

Some of my readers may perhaps think that this sweeping generalisation, instead of conducing to scientific clearness, confounds into one common character many distinctly individual elements which, at the cost of prolonged observation and laborious study, eminent pathologists have striven to differentiate from each other; and that, granting even the fundamental identity of neuralgia and all other kinds of pain, neuralgia nevertheless presents itself under aspects and conditions, and necessitates methods of treatment, so different from those of other diseases in which pain is a prominent feature, as, in fact, to make it incum-

bent on the practical physician to study and recognise the distinctions in question. There undoubtedly seems to be considerable force in this objection. I must observe, however, that experiences extending throughout long periods in different departments of science and art concur in proving that even for practical purposes the sooner any general proposition, which has become an established truth receives practical recognition the better. Perfect art is science in bloom, and is the highest expression of it; and, unless the relation between any given science and the art connected with it be throughout really organic and vital, the blossom is likely to be blighted. If the doctrine, that neuralgia and all other kinds of pain are fundamentally and essentially identical, be indeed true, any such divorce of the practice from the science of medicine as is effected by treating these diverse forms of pain as if their several natures were radically distinct, cannot fail to be fraught with many and great evils. If, on the other hand, supposing that doctrine to be true, it is allowed to shape and direct the whole conduct of the physician in respect to diseases in which pain is a prominent symptom, there is an *à priori* probability that his insight and practice will be far more correct, and therefore successful, than would be the case under any other circumstances; and I think, moreover, that this observation is amply justified by experience.

Dr. Anstie has devoted the second part of his volume to a discussion of what he calls the "counterfeits" of neuralgia. These comprise myalgia; spinal irritation; the pains of hypochondriasis, of locomotor ataxy, of cerebral abscess, of alcoholism, of syphilis, of sub-acute and chronic rheumatism, and of latent gout; colic, and "other pains of peripheral irritation;" dyspeptic headache. And the aim of his book, as already intimated, is to "vindicate for neuralgia the distinct and independent position which" he has "long been convinced it really holds, and to prove that it is not a mere off-shoot of the gouty or rheumatic diathesis, still less a mere chance symptom of a score of different and incongruous diseases." I infer from this passage, as well as from the general tenor of Dr. Anstie's work, that pain which may happen to be a symptom of any one "of a score of different and incongruous diseases' is not genuine neuralgia. How then does he distinguish what he calls "true neuralgia" from such pain? He says: "The first and most essential characteristic of a true neuralgia is, that the pain is invariably either frankly intermittent, or at least fluctuates greatly in severity, without any sufficient and recognisable cause for these changes" (p. 165). But many patients suffering from distinctly recognisable organic disease experience pain so severe, and so thoroughly paroxysmal and periodic, as to be indistinguishable from the typical neuralgia produced by

"malaria." Cases of this kind, in which the pain is indubitably caused by organic disease, often occur, and many such have been carefully recorded. In the chapter on "The Exciting Causes of Neuralgia," several such cases are described. In a case of cancer, the patient's "most prominent symptom was extremely acute pain on the left side of her face, which was seldom completely removed, *but became more severe in paroxysm*. "It was regarded," says the eminent pathologist, Dr. Bright, under whose care she was, "*as tic douloureux by all who had seen her.*" I do not think the testimony of any one on this question can be more weighty than that of Trousseau, who says: "This *intermittent* and periodic character shows itself even in organic affections of the greatest gravity," a statement which he confirms by describing three cases of cancer of the womb, the most notable symptom of which was paroxysmal, intermittent, and periodic pain. In the first case the patient "had every day paroxysms of awful pain; it lasted from three to four or five hours, and then ceased, to reappear on the following day at exactly the same hour." In the second case, the "excruciating pain recurred every day, but strangely enough it returned from half-an-hour to three-quarters of an hour, or an hour later each time. The neuralgic paroxysm did not last more than four or five hours, and then quiet was restored, all pain ceased." In the third case the patient was under his care "for nearly a year, and during that period the pain recurred every day with hopeless violence and obstinacy between twelve and two o'clock, and ceased about five or six in the day." This distinguished physician also records three cases of aneurism, in which, during a long period, the only notable symptom was pain, thoroughly "intermittent," or fluctuating. Referring to one of these cases, he says: "All the medical men whom the patient consulted, and I among the rest, thought that the case was one of rheumatic neuralgia." Here, then, are six cases observed by one physician, in which terrible organic disease manifested itself chiefly or exclusively by pain, of a kind corresponding exactly to what Dr. Anstie defines as "the first and most essential characteristic of a true neuralgia." In each of these cases the pain was certainly "a mere symptom;" whether or not it was only a "*chance* symptom" is a question the decision of which cannot affect the present argument. Moreover, the one solitary case of neuralgia, the *post-mortem* phenomena of which are adduced by Dr. Anstie in support of his pathology of the disease, was pre-eminently a case in which the neuralgia of twenty-six years' duration was "a mere symptom" of aneurism of the carotid artery within the cavernous sinus. "The paroxysms seized the patient without the slightest premonitory symptoms, with the velocity of lightning." They were intermittent; indeed, Romberg, in his description designates

them "fits," and I am saved the necessity of showing in detail that the whole history of this case is a history of phenomena resembling in all respects those of a "true neuralgia," by the fact that everything which Dr. Anstie says concerning it shows that he regards it as a typical case of true neuralgia.

The second of the "positive signs" of a true neuralgia, he says, consists in the fact that "the severity of the pain is altogether out of proportion to the general constitutional disturbance." But this sign was especially observable in each of the seven cases of grave organic disease just cited, in which the neuralgia was a mere symptom.

Again, Dr. Anstie says: "True neuralgic pain is limited with more or less distinctness to a branch or branches of particular nerves; in the immense majority of cases it is unilateral, but when bilateral it is nearly always symmetrical as to the main nerve affected, though a large number of peripheral branches may be more painful on one side than on the other." Now, any of my readers who will take the trouble to refer to the original records of the cases just referred to, and to note carefully their symptoms, will, I feel sure, become convinced that those symptoms correspond in a strikingly accurate degree to the description just quoted.

The fourth characteristic of a true neuralgia is, Dr. Anstie says, that "the pains are invariably aggravated by fatigue, or other depressing physical or psychical agencies." His theory probably induces him to lay especial—I think undue—stress on this characteristic; but certainly to whatever extent it may be observable in "true" neuralgias, it must, *à fortiori*, be also observable in neuralgias which are "mere chance symptoms" of grave organic disease.

Tested with the utmost care and impartiality, the characteristics of a "true neuralgia" relied on by Dr. Anstie as a means of differentiating it from pain which is a "mere chance symptom of a score of different and incongruous diseases," prove, as it seems to me, worthless; and, in fact, although these words quoted from his preface lead his readers to expect from him the means of differential diagnosis between neuralgias of centric origin, and those which, arising from some peripheral cause, are symptoms only, he virtually forgets, in his chapter on "Diagnosis," his implicit promise, or rather he abandons the attempt to fulfil it. Assuming the presence of what he affirms to be the characteristics of a true neuralgia, he says: "We expect to find in by far the largest number of instances that the patient has either previously been neuralgic, or liable to other neuroses, or that he comes of a family in which the neurotic disposition is well-marked. Failing this, we are strongly to doubt the neuralgic

the malady, *unless we detect* a poisoning of the blood by malaria; a powerfully operating, or very long-continued peripheral irritation centripetally directed upon the sensory nucleus of the painful nerve; or, a constitutional syphilis." He adds: "I must insist that the above picture includes only the essentials for a diagnosis of neuralgia; if the painful affection will not answer to the conditions therein included, we have no right to call it neuralgia, it belongs for every practical purpose to some other category of disease." But surely if Dr. Anstie recognises that neuralgia may be produced by malaria, by syphilis, and by those very numerous agents classed under the general denomination, "peripheral influence," he recognises implicitly at all events that in a large proportion of cases neuralgia is, strictly speaking, only symptomatic—in fact, a "mere chance symptom of a score of different and incongruous diseases."

It thus appears, if we assume the correctness of the doctrine that neuralgia is radically distinct from other kinds of pain, that that doctrine affords us no reliable aid when we attempt a differential diagnosis of neuralgia from pains which are demonstratively symptomatic of some other disease—aneurism, cancer, or syphilis, for example. Precisely where it is most trusted by its ablest advocate to prove of essential service in enabling him to effect such a diagnosis, it fails him altogether. But while in this respect proving itself useless, it is, in fact, worse than useless; for, luring those who follow it to look on neuralgia as likely to be of spontaneous or independent origin, it so tends to pervert their vision as to prevent them from either seeing, or even looking for its real causes. If, on the other hand, neuralgia and all other kinds of pain are recognised as being, with respect to their essential nature or proximate cause, thoroughly identical, and if we believe that the predisposing and exciting causes of pain in a large proportion of cases are discoverable, we are strongly induced and encouraged to make an exhaustive search for the cause of the pain in every case, in the justifiable hope that when it is discovered and removed, its effect—the pain or neuralgia—will cease. In fact, if the doctrine last mentioned be true, the scope for diagnosis in respect to neuralgia is exclusively within the sphere of causation. But within this sphere there is ample space in which to exercise and test the insight and judgment of the most sagacious and experienced physician; and he who, being thoroughly acquainted with all the possible causes of neuralgia, is most competent to diagnose the special cause operative in each case, and distinctly to differentiate it from all other possible causes, is best qualified to cope with the disease, and, if possible, to cure it.

Prognosis.—According to the general experience of physicians in every country, the prognosis of that kind of pain commonly re-

cognised as neuralgia, is on the whole very unsatisfactory, and not seldom extremely grave and dismal. And, indeed, considering the confessedly chaotic and widely divergent views concerning the proximate cause or genesis of pain which still generally obtain, I do not see how the treatment of neuralgia can possibly be established on any rational principle likely to lead, as a general rule, to any satisfactory result. "The structural disorders which constitute the groundwork of neuralgias, are for the most part," says Rosenthal,* "veiled in darkness." After expressing the supposition that the immediate cause of neuralgia consists in changes in the molecular mechanism of the sensory nerve masses, and that in every case of neuralgia all remote and predisposing causes become in the last analysis common factors of such changes, Eulenberg† adds, "In what this change in the molecular mechanism in the sensory nerve masses consists is to us, it must be freely admitted, still completely dark; and all that has been advanced on the subject belongs solely to the region of arbitrary hypothesis and speculation." Indeed, notwithstanding the broad general statement just quoted, viz., that in every case of neuralgia there is a change in the molecular mechanism of the sensory root of the affected nerve, I am not sure that this distinguished physician intends even that statement to be received as unexceptionally true, for the emphasis with which he distinguishes between "central" and "peripheral" neuralgias in his remarks on both diagnosis and prognosis, makes it doubtful whether he thinks that in cases of the latter there is any centric change at all. The reader is also aware how diametrically opposed is the pathology of neuralgia expounded in this volume to that taught by Dr. Blande Radcliffe, as well as to that espoused by Dr. Anstie. Such being the different views held at the present time by men who have given special attention to the subject, it is manifest that the pathology of neuralgia has still to enter on the scientific or positive stage; and I need hardly point out that until it does so the treatment of the malady must either continue empirical, or be guided by hypotheses which are still waiting for confutation or verification by that test which can alone be accepted as final—the general experience of the profession, and that meanwhile the prognosis must at best be vague, uncertain, and unsatisfactory.

What, according to experience, hitherto, may be said concerning the prognosis, has been briefly and well summed up by Eulenberg as follows:—

"The prognosis of neuralgia varies in a high degree, according to the neuralgically affected nerve regions, a distinction which essen-

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* *Op. cit.*, p. 460.
† *Op. cit.*, p. 51.

tially depends upon the difference in the ætiological momenta which are principally at work. Thus for example the prognosis of sciatica is in general more favourable than that of trigeminal neuralgia, because it originates much less frequently in central and constitutional anomalies; on the contrary, it is far more frequently produced by peripheral, mechanical, or rheumatic injuries, &c. Moreover, all nerves do not possess, as it were, equal pathological and physiological rank in the totality of the organism: a neuralgia of the trigeminus, for instance, may call forth physical and psychical reactions very different from those of an intercostal neuralgia, or a sciatica. Finally, all neuralgias are not equally accessible to local treatment. This constitutes a very great difference in respect to their local or surgical treatment. Neuralgias of superficial and purely sensory nerves, such as the sensory branches of the trigeminus, permit surgical manipulations, which can never be attempted in visceral sensory nerves, and only in the most rare and exceptional cases in the mixed branches distributed to the trunk and extremities.

"The seat and character of the cause of the disease have, of course, in general a predominating influence, but only in connection with a proper consideration of all individual circumstances, presented by the particular concrete case—predisposing momenta, state of nutrition, duration of the affection, &c. The final prognosis must be compounded of all these single factors, and may, therefore, greatly differ in respect to the same neuralgia, even if the locality and nature of the cause of the disease should be precisely the same. Peripheral neuralgias permit in most cases of a better prognosis than the central. This must be essentially referred to the fact that peripheral neuralgias are mostly derived from injuries (traumatic, mechanical, rheumatic) of a more accidental kind, while central neuralgias have frequently their origin in congenital and hereditary momenta, general disturbances of nutrition, &c. Hence it is possible to enunciate the previous statement also in the following manner:—The more accidental neuralgias permit, *cæteris paribus*, of a more favourable prognosis than those which rest upon a congenital or hereditary foundation. The prognosis in peripheral neuralgias is, doubtlessly, more favourable, because they are more accessible to a direct local treatment than are the central neuralgias.

"It must further be observed that those neuralgias which are typic, which recur at regular intervals, and which are mostly produced under the influence of malaria, permit of the most favourable prognosis, because under proper treatment they are almost constantly cured. On the other hand, in a typic irregular neuralgia, the prognosis is at the outset comparatively less favourable; this is also the case both in accidental as well as constitutional neuralgias with a typic course.

"The unfavourable element in the prognosis refers solely to the definite cure of neuralgia, but not to a palliative mitigation of its most agonizing symptoms, which, with our present remedies, can almost always be vouchsafed, and still more certainly not *quoad vitam*. Life is hardly ever in immediate jeopardy by a neuralgia. Nevertheless, it is to be recognised that indirectly, even without further complications, the duration of life may be shortened by serious and obstinate neuralgias, in consequence of the sleeplessness, psychic exhaustion, and often inappropriate mode of living of such patients, and perhaps also in consequence of the improper treatment which they sometimes undergo."

I have translated these passages from Eulenberg's work, because, as he holds no theory concerning the nature of the change which obtains in the affected sensory nerve-root in cases of neuralgia, he is likely to represent, with a fair approach to judicial impartiality, the actual experience of the profession in the matter in question. If I believed with Dr. Anstie, that "true neuralgia" is the expression of an interstitial atrophy of the posterior root of the affected nerve, my prognosis would certainly be much graver than is that generally indicated in his section on the subject; but fortunately the gloomy prophecies which are the logical conclusions from his theory, seem to be corrected by the more cheering results of his actual experience, which, as he describes it, accords in the main with that reported by Eulenberg. If, on the other hand, I were to write on the prognosis of neuralgia from the dictates of my own experience only, I should express myself so much more favourably even than Eulenberg has done in the passages quoted above, that what I might say would probably be regarded as the language of an exaggerated enthusiast; and however this might be, I think it best to defer for the present any attempt to forecast the results likely to be attainable by those physicians, who combine with the best therapeutical means hitherto within their reach the practice of the Neuro-dynamic method which I have introduced, and, therefore, I close this section by suggesting to those of my readers who are anxious to form an opinion on the subject, that the best way of doing so will be to study the reports of cases constituting the concluding chapter of this work.

CHAPTER XIII.

THE TREATMENT OF NEURALGIA.

NEURALGIA, in a large proportion of cases, would subside spontaneously if its cause were removed; it is therefore necessary in every case to search thoroughly for the cause of the disorder. If it be found, and if it be removable, it should, of course, be removed without delay. But, unfortunately, a large number of cases present themselves in which either the cause is not discoverable, or, if discoverable, is not removable; and in many of those cases in which it is both discoverable and removable, its removal can only be effected by the prolonged operation of the remedies employed. Meanwhile, it behoves the physician to do all in his power to arrest or relieve the pain. And as the two processes often need to be carried on simultaneously, I shall reserve what I have to say concerning the removal of removable causes until I have passed in review the principal remedies now made use of, and have traced in outline the general principles and method of treatment which I have found to be the most successful.

The methods of treating neuralgia, as, indeed, of every other disease, may be primarily divided into two kinds: one of these consists in making use of the extremely numerous and extremely heterogeneous remedies stored up by empiricism; the other comprises those remedies which are logical outgrowths of hypotheses concerning the nature and causes of the disease. Obviously, the different remedies of this class are likely to be efficacious in proportion to the measure of truth contained in the several hypotheses of which they are respectively the products. A pathology of neuralgia, however ingenious, and however conscientiously elaborated, may, indeed, be only an *ignis fatuus*, luring those who follow its guidance into the wildest regions of therapeutics, where error, disappointment, and serious danger even may beset every step: or, on the other hand, it may be a genuine scientific light, showing the way by which a rational and successful method of treatment may be attained. Moreover, it must be borne in mind that a theory concerning the nature of the immediate cause of a disease may give rise to a successful method of treating it, even though the theory itself be untrue; and it is well known

covered by the help of theories of any kind, whether true or false, but are simply the fruits of experience. And aware of the obscurity in which the essential nature of neuralgia has hitherto been veiled, and recognising the difficulties which have confessedly been encountered by all who have attempted to ascertain the character of the material change underlying and causative of the phenomena of the disease, the great body of medical practitioners have found it expedient to be guided in their treatment of it by that copious collection of empirical prescriptions which find a place in every treatise concerning it. In like manner, while endeavouring to estimate the value of the more important of the remedies now in use, I shall attend chiefly, indeed almost solely, to the dictates of experience.

Quinine was once regarded as almost a specific for neuralgia; but careful and prolonged experience of its effects has divested it of much of the repute as a curative power formerly attached to it. Even now, however, it still remains, I am inclined to believe, the most efficacious of all the internal remedies which are employed. In those cases in which it is successful it is generally given in very large doses, and its efficacy becomes quickly manifest. Cases occur in which, after many and various remedies, including quinine itself in small doses, have been tried in vain, the medicine given in doses as large and as often as can be borne, completely annuls the pain. Valleix, in his section on "Névralgie en général," says that in twenty-eight cases in which the patients were treated by means of quinine a cure was effected in only six; in two more of the cases it afforded considerable relief. He expresses a decided opinion that if quinine, when given in large doses, produces no beneficial effect within three or four days nothing is to be hoped from it. This opinion is shared by Romberg. When neuralgia was much more frequently of "malarial" origin in England than it is at present, quinine was likely to prove curative much oftener than it does now; indeed, as intimated long ago both by Valleix and by Romberg, and recently by Eulenberg, decided benefit can only be expected from the use of quinine in cases of a distinctly intermittent type. But though this valuable medicine, if taken in time, may cut short, or prevent the permanent establishment of, neuralgia, it is rarely capable of effecting more, after the disease has become thoroughly established, than a postponement of the recurrence of its paroxysms, or a modification of them when they do recur. In fact, the opinion I have formed concerning the mode of action of quinine* leads me to believe that its continued use in cases of

* See some remarks on the mode of action of quinine in my work on "Diarrhœa and Cholera," p. 206-7.

confirmed neuralgia intensifies those conditions on which the existence of the disease depends, and strengthens its hold on the system. I have often tried quinine in cases in which the paroxysms did not recur at regular intervals, and quite recently one of my patients at the Farringdon Dispensary, who had suffered during three months from very severe trigeminal neuralgia recurring irregularly each day, was thoroughly cured by large doses of quinine; but I must confess that it has rarely been my good fortune to cure severe and long-continued neuralgia by means of this drug.

Arsenic produces certain effects like to those produced by quinine, and, like it, is a powerful antiperiodic. In cases of "malarial" neuralgia, in which quinine has failed to effect a cure, arsenic has often succeeded; and where each fails when given separately, they sometimes effect a cure when given together. Romberg expresses great trust in arsenic as well as in quinine as a remedy for acute intermittent neuralgia; and Eulenberg relies so completely upon the two used singly or conjointly, that he says they "cure these neuralgias almost alone, and, consequently, other means may, as a rule, be completely dispensed with."* Dr. Anstie cites a case of "purely neurotic angina of the severest type," in which "the influence of arsenic was very striking." He adds, "I believe that in at least three patients I have so completely broken down a morbid succession of attacks as to substitute for them a mere remnant of a tendency to 'tightness in the chest' after any unusually severe bodily exertion or mental emotion" (pp. 182-3). I have not tried arsenic in any case of visceral neuralgia, but have repeatedly done so in cases of superficial neuralgia with one uniform result—failure.

Bromide of Potassium is in many cases of neuralgia an especially valuable medicine. Of all drugs, the action of which is well known, it is the one which represents most nearly the *modus operandi* of the spinal ice bag when applied in a particular way, which will be hereafter indicated; and the two may often be used together with great advantage. Bromide of potassium exerts a powerfully sedative influence on the nervous centres, and by doing so is capable of at once lessening pain and conducing to sleep. Among its disadvantages must be mentioned its tendency to lower unduly the vitality of the whole organism, and therefore of the brain, and thus to depress mental energy and the animal spirits, and even to produce various degrees of heaviness and stupidity. As the action of drugs introduced into the blood cannot be limited to any particular part of the body, it often happens that a medicine which is exerting a beneficial influence on one part of the body is exerting a baneful one on others. The effects of bromide of potassium are often exemplified, in this way;

* *Op. cit.*, p. 70.

and thus, while great benefit is being derived from its sedative influence on the spinal cord and the ganglia of the sympathetic, an injurious effect is produced by its powerful depression of the life and energy of the brain.* Still, when used judiciously, this valuable agent may be the means of doing much good in neuralgic cases without at the same time doing a *corresponding* amount of harm; and when in such cases I am obliged (as I am very often at the Farringdon Dispensary) to trust to the action of drugs only, I not infrequently use bromide of potassium, sometimes combined with tincture of aconite, sometimes alone, and many patients derive much relief from this treatment. And I may observe here, that in so far as bromide of potassium, as well as aconite, proves beneficial in the treatment of neuralgia, it does so by virtue of its power of depressing the vitality of the algic centre, and that doing so it affords another proof that that centre is not atrophic, but rather hypertrophic.

Chloride of Ammonium has found favour in the eyes of a few physicians as a valuable remedy for neuralgia, and according to my experience it is more efficacious than is bromide of potassium in annulling those obscure and more or less shifting, but long persisting, pains which the poor who attend Dispensaries and the out-patients' rooms of hospitals often complain of. Moreover, while lessening pain, which it probably does by so influencing the blood as to disperse slight local congestions which induce irritation, and, secondarily, pain, it exerts no depressing influence, but seems, on the contrary, to improve the general health. A physician recently informed me that so great was the success which he had had in treating neuralgia by this drug in large doses that he regards it as a specific. I fear that increasing experience will greatly modify this estimate; still, I do not think that the virtues of this drug, which are well understood by German physicians, are duly appreciated in this country.

Aconite is deservedly praised for its antalgic power. I have frequently prescribed its use both internally and externally, and have often had opportunities of observing its beneficial action, especially in cases in which there was a tendency to general feverishness or local inflammation. Its well-known benumbing influence, which can be exerted without stupifying the patient, renders it one of the least objectionable of palliatives; but inasmuch as it is a deadly poison and lessens the vital force very rapidly, its internal administration needs to be superintended

* Medical literature abounds with evidence of the extremely depressing influence on the nervous system of bromide of potassium: among the most recently published observations on this subject are those of Dr. T. O. Wood, entitled,—"Some of the ill effects of Bromide of Potassium," and contributed to the *British Medical Journal* for October 14, 1871.

with the most watchful care. Dr. Handfield Jones says he is "shy of administering it internally." My experience of its internal use, often in rather large doses, has been considerable, and without any unpleasant consequences; indeed, I am inclined to believe that the greatest benefit derivable from aconite is only obtainable when it is given internally. I must add, however, that though I have found it very useful as an auxiliary, it has never in my hands proved curative of a single case.

Nitrite of Amyl.—The remarkable power possessed by this rapidly vaporisable fluid of producing dilatation of the capillary blood-vessels justifies the inference that its principal effect on the nervous system is one of profound depression. This consideration led me, in 1866, to express a hope* that it might prove of service in the treatment of the collapse stage of cholera; and for the same reason it seems likely, *à priori*, to prove a valuable remedy for neuralgia. And, as a matter of fact, it is capable of giving more or less relief in many cases. My experience of it, however, does not lead me to think it will ever be found of great and permanent use as an antalgic remedy. I have frequently caused the arrest of a neuralgic paroxysm by its agency, and were it possible by renewed inhalation of it each time a paroxysm is coming on to avert or cut it short, the paroxysmal habit might, perhaps, after a time, be wholly abolished. But, unfortunately, I find that patients who derive temporary relief from inhaling the vapour, soon begin, before they have used it long, to feel a dislike to it—a dislike which soon grows invincible; so that at length they will suffer the pain which they know it will relieve or lessen, rather than use it. This is my own experience; but not mine only: in Dr. Anstie's work (p. 82) he mentions a case of angina pectoris, in which the nitrite of amyl gave great relief, but in which its use was abandoned because the patient "at last conceived a horror of it." Dr. Anstie says,—"So distressing and alarming to him was the sense of fulness in the head produced by the amyl, that notwithstanding his certain knowledge that he could at once cut short a paroxysm, he could not persuade himself to continue its use, and for some time past he has returned to the use of the ether and (though in less quantities than previously) of the brandy for this purpose." I must add, however, that these untoward experiences, witnessed by Dr. Anstie and myself, do not appear to have been verified by Dr. Talfourd Jones, who, in the *Practitioner* for October, 1871, published a report of several cases of Neuralgia treated by Nitrite of Amyl. According to that report, nothing could be more satisfactory than the invariable—almost miraculous—success which attended

* In my work on "Diarrhœa and Cholera," p. 208.

his administration of that substance; and fortunate will it be for neuralgic sufferers if results of its use like to these which he reports may be expected as a general rule, while those which Dr. Anstie and I have experienced form a part of what are merely exceptions to it. But I have strong misgivings; and, indeed, already fear that the same *couleur de rose* which, according to Dr. Talfourd Jones, invests the prospects of future sufferers from cholera if only their medical attendants will treat them with nitrite of amyl,* may have suffused his experiences of the treatment of neuralgia by that agent.

Dr. Anstie thinks that the objection manifested by his patient to the nitrite of amyl, "although probably needless" in this particular case, "may have real importance in certain circumstances;" and that, inasmuch as the inhalation of amyl is followed by the sudden relaxation of the systemic arteries, "it would appear" that, in the case of the brain, "a serious strain must be suddenly thrown upon the capillary network. This being the case, it appears likely that where the *atheromatous* change has considerably invaded these delicate vessels, they might prove too brittle to stand the sudden distension, and a rupture and consequent cerebral hæmorrhage might ensue" (p. 82). This view is, perhaps, strictly correct; but a careful study of the physiological effects shown by Dr. Wood, of Philadelphia, to be produced in animals by submitting them to the influence of the nitrite of amyl,† leads me to believe that its directly depressing, deadening, influence on the nervous system, when inhaled frequently, in even moderate doses—say from five to ten drops—is so great that most patients, and especially those who are constitutionally feeble, will instinctively shrink from its use, and for a better reason than they know, after a short experience of it. When it was tried in cases of choleraic collapse in Dublin, it seemed to promise, in several cases, to loose the spasm-bound blood-vessels, and to allow the blood pent up in the large vessels to circulate again, but *patients could not be induced to persist in inhaling it.*‡ If

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* In the *British Medical Journal* for Septemer 30, 1871, Dr. George Johnson's questionable pathology of cholera is pronounced by Dr. Talfourd Jones to be a great discovery; and, "when reading last month," he says, "Sir Thomas Watson's interesting lecture on Cholera, all at once the thought flashed through me, 'Why, nitrite of amyl is the very remedy!'" Unfortunately it had already been tried and abandoned.

† See *The American Journal of the Medical Sciences*, No. 123. New Series. Art. II.—"Experimental Researches on the Physiological Action of Nitrite of Amyl." By H. C. Wood, M.D.

‡ See *British Medical Journal*, January 13, 1872, p. 42, containing an extract, by Dr. T. L. Brunton, from the Report of the Treatment of Cases of Cholera in the Mater Misericordiæ Hospital, Dublin, in 1866, by Drs. Hayden and Cruise of that city.

only the brain could be excluded from its influence, while the spinal and sympathetic centres are being acted on, much indeed might be hoped from it; but, as probably this localisation of its operation will always remain impracticable, the amount of benefit derivable from it will, I fear, prove much less than it appears at first sight to promise.

I may remark here that with respect to the nature of the proximate cause of neuralgia, a consideration of the *modus operandi* of nitrite of amyl is especially instructive. Dr. Anstie has "no doubt that the effect of inhalation of amyl is to relax, very suddenly, the tonic contraction of the systemic arteries;" we know that a like effect is produced when a sedative or paralysing influence is exerted on the ganglia of the sympathetic; and therefore, from this effect alone of the nitrite of amyl, we are obliged to conclude that its effect on those ganglia is a depressing one, and that its effect on the cerebro-spinal centres must be of a like nature. And all Dr. Wood's experiments confirm this conclusion. But it is found that nitrite of amyl is capable of stopping a paroxysm of neuralgia as if by enchantment: now, if the conclusion just expressed concerning the *modus operandi* of the vapour be correct, how is it possible to avoid the additional conclusion that the proximate cause of pain is hyperæmia, or excessive vitality of the algic centre?

Opium and Hydrochlorate of Morphia, as temporary palliatives, are well known to be thoroughly effective in the great majority of cases; but as remedies their power is, I fear, extremely slight. In ten cases of trifacial neuralgia, Valleix tried opium alone, and he reports that "it had no appreciable effect whatever on the disease: it only numbed the sensibility" (p. 188). I have often seen temporary ease, but never permanent benefit from the use of opium. Morphia, however, since Dr. Alexander Wood's introduction, in 1855, of the practice of treating neuralgia by hypodermic injections, has been found to be not merely a palliative, but, in some cases, a curative agent. Dr. Lawson and Dr. Anstie, who have had considerable experience of this remedy, report strongly in its favour. Dr. Anstie prefers "the use of a solution of five grains of acetate of morphia to the drachm of distilled water," and judiciously observes,—

"We ought never to commence with a larger dose than 1-6th of a grain; but very often as little as 1-12th grain will give effective relief, and in not very severe cases it is well worth while to try this smaller quantity. When no larger quantity than 1-6th grain is employed, we commonly observe no narcotic effects, *i.e.*, there is no contraction of pupil, no heavy stupor, and, although the patient very often falls asleep, on waking he does not experience headache, nor is his tongue foul. I cannot too strongly

express the opinion that it is advisable, by all means, to content ourselves with this degree of the action of hypodermic morphia, unless it fails to produce a decided impression on the pain. But in very severe cases our small doses will fail; and then, rather than allow the patient to continue having severe paroxysms unchecked, we must frankly admit the necessity of using a narcotic dose from $\frac{1}{4}$ to $\frac{1}{2}$ grain, according to circumstances. Whatever actual dose be employed, it is important not to repeat it with unnecessary frequency; once a day in the milder, and twice a day in the more severe cases, will be all that is advisable, save in very exceptional cases: the point being to administer it as quickly as possible after the commencement of an exacerbation. If, by these means, we can prevent the patient having any severe pains during a period of several days, we often give time to the affected nerve to recover itself, and we can drop the injections, either at once or by rapid diminution of the dose. But if we have been driven to the use of distinctly narcotic doses, and these do not very speedily break the chain of neuralgic recurrence, it will not do to continue to rely upon hypodermic morphia; it will be best to try some of the local remedies (blistering, galvanism) with it" (pp. 187-8).

Eulenberg* sums up his appreciation of the effects of hypodermic injections as follows:—

"The injections of morphia act as the surest, almost never-failing palliative agent. Considering how powerless we are frequently with reference to the causal momenta, our aim in neuralgias must above all consist in meeting the *indicatio symptomatica*,—that is, in soothing and removing the agonising feelings of pain. In this respect narcotic injections effect not only more than all other palliatives, but also, and especially, far more than the internal use of narcotics, because the general action of these injections upon the nervous system and the diminution of pain dependent upon them are obtained much more rapidly, more reliably, and more completely. Moreover, in neuralgias with peripheral basis they diminish the excitation which passes on to the brain, because they lower directly the excitability of the peripheral nerves by their local action. Besides this almost never-failing palliative effect, experience shows that in many cases, especially in recent neuralgias of peripheral origin, a permanent cure may be obtained by hypodermic injections. The clue to an understanding of the *rationale* of this effect lies in the local influence of narcotics upon sensory nerves, since every injection directed upon a sensory or mixed nerve-trunk causes a diminished sensibility in the whole region of the skin connected with it; and hence a decrease in the excitability

* *Op. cit.*, pp. 76-7.

of all sensory fibres of the corresponding nerve. Hence injections meet not only the *indicatio symptomatica*, but also the *indicatio morbi*, for if repeated at appropriate intervals they lower permanently the excitability of the sensory fibres so much, that even though the peripheral cause continues to act, yet the degree of excitation necessary for the paroxysm of pain is no longer transmitted to the nervous centres. From this follows the possibility of a cure in peripheral neuralgias, even without a consideration of the *indicatio causalis;* still, such a curative action of injections is always far more uncertain and rare than the palliative effect. In neuralgias with central basis it is obvious that only the general effect of narcotics, their calming action upon the central organ, comes under consideration. A cure is, indeed, here also not impossible; for if the excitability of the sensory centres be permanently lowered, a stimulation which originally caused pain may no longer be perceived with the same vigor and be felt as pain; but observation shows that mostly only a longer or shorter interruption of the pain is effected by injections of morphia. According to my experience, about twenty-five cases of neuralgia out of a hundred appear to be capable of a permanent cure by an appropriate and long-continued use of injections."

Another method of using morphia with rapid and temporarily beneficial effects at any rate, is by applying it over a blistered surface. Trousseau found that when the cuticle had been removed by means of caustic ammonia, he obtained much better results than were obtained when the morphia was sprinkled over a surface made raw by cantharides. He could not account for this difference, but affirmed it to be "a clinical fact." He has carefully described in detail this method of applying morphia, and those of my readers who have had no experience of it, and who desire to try it, will do well to acquaint themselves with his method of procedure.* Thus applied, "the first effect of the morphia," he observes, "is marvellous. A few minutes are sometimes sufficient to calm an awful pain; and it rarely occurs that great relief is not afforded in a violent neuralgia. But there is a world-wide difference between this and a real cure, and the pain generally returns when the narcotic effect of the drug has passed off. It is necessary then to keep the system under the influence of the remedy for a more or less prolonged period; and a fresh application is to be made in the evening, and twice again on the following day. In that way the pain may, in a great number of cases, be entirely suppressed for some time."† This estimate of

* See "Lectures on Clinical Medicine." By A. Trousseau, translated by P. V. Bazire, M.D. Part II. P. 498, *et seq.*

† *Ibid.*

the amount of benefit derivable from morphia seems to me fairly accurate. In many cases of neuralgia in which the disorder is either slight or recent, it may often be annulled by one medicine or another, and in such cases it is to be expected that morphia, however administered, and especially if administered by hypodermic injections, will sometimes prove completely successful; but they who expect by this treatment to cure neuralgia which is at once severe and chronic are likely to experience grievous disappointment. Valleix reports the cure of a case of facial neuralgia by the internal administration of morphia; but we are not informed how long the patient had suffered. He says, "at the end of eight days of this treatment the pains began to lessen, and at the end of the eight following days were completely dissipated. They no longer existed when the sub-carbonate of iron was given in order to induce menstruation, which had not occurred during two months, and which came on with normal abundance" (p. 189). It seems probable from this account that the neuralgia was connected causatively with the suppression of the catamenia; and it is likely that the morphia produced in the condition of the nervous system a favourable change, which predisposed the womb to resume its normal menstrual function. Of course, if its suppression were the cause, its re-establishment was, it is to be presumed, the cure of the neuralgic disorder. Rosenthal reports that in two cases known to him of frontal and supra-orbital neuralgia which had continued several months and which were treated persistently by hypodermic injections of morphia during several weeks, the pain was completely got rid of, and at the end of two years had not returned. But, nevertheless, he remarks, subcutaneous injections generally fail to be of service.* Exact knowledge of the character of the cases, 25 per cent. of which Eulenberg reports to have been cured by this method, would be especially instructive. Unfortunately, he gives no information concerning either the duration or degree of severity of any one of them; and therefore as data for the formation of a correct estimate of the therapeutical efficacy of morphia administered hypodermically the mere numerical results he mentions have little value.

Experience has, I think, thoroughly established that though when morphia, thus administered, exerts a constitutional influence, its injurious effects on digestion and the action of the bowels are reduced to their minimum; but that such effects are often pro-

* "Schliesslich versagen aber doch die subcutanen Injectionen zumeist ihren Dienst." Handbuch der Diagnostik und Therapie der Nervenkrankheiten von Dr. Moriz Rosenthal. 1870. P. 497.

duced I suppose no physician will dispute. Moreover, it will be generally admitted that morphia exerts specific effects of a baneful kind on the cerebro-spinal system, and that, therefore, when by means of it palliation only of pain is obtained, it is questionable whether the cost of such palliation is not greater than its worth. It has been my lot to see many sufferers from neuralgia who have been treated without any permanent benefit by morphia administered subcutaneously as well as by the stomach; and my deliberate conviction is, that in those cases in which its only benefit consists in numbing the pain, and in which this benefit is repeatedly obtained by frequent and persistent recourse to the drug, the disease is rendered much more intense, inveterate, and difficult of eradication than it would have been if morphia had not been used.*

Iron was a fashionable remedy some time ago; but its uselessness, except in a small proportion of cases, is only too well attested. In fact, it may fairly be said that the professional belief formerly so strong in this remedy has all but died out. Considering the great extent to which iron was used, the great professional reputation it obtained, and the large amount of evidence adduced in its favour as a remedy for neuralgia, by Hutchinson, and afterwards by Elliotson, the smallness of the real foundation for the great repute it obtained—viz, the actual potency of the different preparations of iron as antalgic medicines—is truly marvellous. Hutchinson published twenty-seven cases attesting the peculiar efficacy of the carbonate of iron, and at the end of his volume† is a letter, addressed to him by Sir Astley Cooper, stating that he has "reason to believe that it has a very benign influence in that disorder."

The opinion, first expressed, I think, by Brown-Séquard, that iron is injurious to epileptics, is, according to my experience, thoroughly well founded; and I must add that in cases of neuralgia iron has often seemed to me to increase the frequency and intensity of the paroxysms. I can imagine that in cases of passive hyperæmia or congestion of the nervous centre implicated iron may be of use, and probably it is in such rare cases of neuralgia that it has proved curative; but in cases of active hyperæmia, if the pathology of neuralgia of which I have given an outline, be correct, it is not easy to understand how any form of iron can exert a specifically beneficial influence over the disease.

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* See observations on the Physiological Effects of Opium in my work on "Diarrhœa and Cholera." P. 195, *et seq.*

† "Cases of Neuralgia Spasmodica, commonly termed Tic Douloureux, successfully treated." By Benj. Hutchinson, F.R.C.S. Second edition. London: 1822.

Trousseau, in his summary of remedies for neuralgia, does not even mention iron. Dr. Downing, who, in his essay, published twenty years ago, makes some judicious remarks on iron as a remedy for neuralgia, says,—"I will venture to assert that in every one of the chronic, reported-incurable cases now existing in this country, this favourite remedy has been repeatedly tried;" and even Dr. Anstie, whose pathology of the disease is likely to predispose him to look favourably on iron as a remedy, says,—"For patients who possess well-globulated blood I do not believe iron has any value." I have tried the saccharated carbonate in large doses repeatedly and persistently; but in my hands it has not once fulfilled the promise held out in Dr. Hutchinson's monograph. Dr. Anstie praises the sesquichloride when given alone, as well as in combination with strychnia, as a remedy for neuralgia. He mentions only one case, however, in which it seemed to be useful; and in that case the patient got into "a peculiar state of restlessness during the day and sleeplessness during the night."

Strychnia is said to be especially serviceable when the disorder is of a remittent or intermittent character; but its services have proved too slight to encourage physicians generally to continue making use of it: Dr. Anstie, however, as mentioned in the preceding paragraph, prescribes it; and he says he has learnt to prize it "much more highly during the last few years than previously." In those cases of neuralgia in which the patient's constitution is generally feeble, I have sometimes found the administration of strychnia *in very small doses*, to be productive of decided benefit; the stronger and healthier the body as a whole is, the more easily does any part of it resist the attacks of disease, and, when diseased, the more energetically it tends to recover itself: this consideration affords, I think, the true explanation of the beneficial influence which, in cases of neuralgia is occasionally, but rarely, excited by strychnia.

Zinc (both the oxide and the sulphate) has been praised by some physicians; but though its efficacy has been vouched for on the Continent, experience of it in this country is far from justifying the praise which has been bestowed upon it.

Phosphorus is, in my opinion, likely to intensify, rather than to palliate, neuralgia; but guided, I presume, by his theory, Dr. Anstie has made use of it, and I quote his remarks upon it. "The preparations of phosphorus which I have employed in the treatment of neuralgia are the phosphoretted oil, the hypophosphite of soda (five to ten grains three times a day), and pills of phosphorus (according to Dr. Radcliffe's recommendation) containing 1-30th of a grain, given twice or thrice daily. Either of the two last will do all that phosphorus can do, but its utility is

not very extensive or reliable. I have found it do most good in cases where there was a high degree of *anæsthetic* complication" (p. 180).

Spirits of Turpentine, of which in the treatment of neuralgia I have had no experience, has been frequently made use of, and considerably praised by several physicians. Trousseau had recourse to it most systematically: he gave it in capsules, each capsule containing from eight to ten drops, and prescribed "from four to five or six" of them twice a day. "This," he says, "is generally enough, although this dose may be doubled, or trebled, without inconvenience. The medicine is continued for six or eight days in succession; I then intermit it for four or five days, after which I resume it, and so on for several weeks. I must, in justice, however, declare that turpentine fails in half the cases of neuralgia, although it is a good remedy of which practitioners should indeed avail themselves"! If it failed in only half Trousseau's cases, practitioners should indeed avail themselves of it. At all events he thought very highly of it, for he says in his clinical lecture, from which the above passage is quoted—"You see, gentlemen, I prescribe turpentine in all my cases invariably"! And Copland had a very favourable opinion of it: "This medicine," he remarks, "although recommended chiefly for sciatica, is frequently of great service, if not equally beneficial in other forms of neuralgia. . . . Sometimes a large dose of the turpentine —from three to six drachms—taken at once, or with half an ounce of castor oil, on the surface of milk or mint waters, almost immediately removes the complaint. In neuralgia of the lower extremities, enemata containing it are often beneficial."*

Croton Oil, which Sir Charles Bell made famous, must, I suppose, have a place in the list of neuralgic remedies; that it effected the cures he described as due to it I do not doubt, and I presume that the cases in which it did so, were cases in which an energetic cathartic was urgently needed; but that croton oil possesses any specific remedial influence over neuralgia, I entirely disbelieve.

Chloroform and *æther* are often prescribed for neuralgic sufferers in order to procure temporary relief from pain, and to induce sleep. Trousseau's directions how to use chloroform or æther in such cases are simple and sensible: "No apparatus is needed, —not even a handkerchief. The patient makes a sort of cone with his hand by bending his little finger completely into his palm, and his other fingers less completely. The cone is open between the thumb and index finger, and as the fingers are slightly separated from one another, air passes through easily. From ten

* "Medical Dictionary." Vol. II., p. 891.

to twenty minims of chloroform are dropped into the palm of the hand, which is then held before the nostrils while the patient draws a deep breath." Unhappily, unless the inhalation of chloroform or æther is almost continuous, the respite from pain which they afford is extremely brief, and even if used with only moderate frequency, they, like opium and morphia, tend, I am confident, to root the disease still deeper in the system. The internal use of sulphuric æther is spoken of by Dr. Anstie as "supremely useful in certain visceral neuralgias." I am acquainted with one case in which its palliative power was well attested; but it exerted no curative influence.

Hydrate of Chloral is useless as a pain-destroyer, except by virtue of its sleep-inducing power. But, happily, it possesses this power disassociated from the objectionable influences which opium and morphia are wont to exert when their hypnotic help is alone desiderated; and, therefore, in those cases in which the practitioner feels constrained to have recourse to a drug in order to lull pain by procuring sleep, chloral is, of course, the one he will make use of. I rarely prescribe it, however, because, as I shall presently show, I adopt a method of inducing sleep which, while avoiding the necessity of poisoning the system at all, lessens pain, and predisposes to really normal sleep at the same time.

Alcohol, taken in small quantities, is in some cases a valuable adjuvant, and occasionally exerts a remedial influence. In one case which came under my notice, the patient who had long been a sufferer from facial neuralgia, and who was a teetotaller, was advised to drink a few glasses of good Rhine wine every day; he did so, and was quickly, as well as permanently, freed from his malady. There are reasons for believing that alcohol is chiefly useful in those cases in which there is a tendency to cerebral anæmia, but I am very far from thinking, as Dr. Anstie does, that it "is a decided help to recovery from every form of neuralgia." On the contrary, I am strongly of opinion that the habit of drinking alcohol as a palliative of neuralgia, often constitutes one of the most formidable obstacles to recovery and that in the great majority of cases it deepens and intensifies the disease.

Blisters.—Their efficacy has been much insisted on. Cotungo used them, and extolled their effects in cases of sciatica; and Valleix, in his chapter on "Névralgie en général," says: "Blisters have constituted the basis of treatment in fifty-two cases, in thirty-nine of these a cure was effected; in seven cases the patients derived marked benefit, and in six cases only no good effect was produced." He adds, "For a considerable time past I have adopted as the treatment of different neuralgias, the application of *flying blisters on the most painful parts*, and in the totality of cases I have obtained either a prompt

and radical cure, or a marked amelioration." Dr. Anstie occupies nearly three pages in discussing the efficacy of blisters. He has recently been led "to apply the blister at some distance from the focus of pain," viz., "as close as may be to the intervertebral foramen from which the painful nerve issues;" and he says, "the results which I have derived from this plan of treatment have been far more satisfactory than those which I used to obtain when I habitually applied the vesication as near as might be to the focus of peripheral pain; and I think that this result tallies well with the idea that the essential mischief in neuralgia consists in an enfeebled vitality of the central end of the posterior root." He admits by implication that the satisfactory results in question never reach to the extent of cure, and he says explicitly that though in certain cases blistering causes the suffering to cease, so long as to make him hope that it might never return, he does not "now entertain any such expectation from this remedy" (pp. 193-4). Referring to his remark that the result of the blisters as he applied them "tallies well" with his idea of the nature of the proximate cause of neuralgia, I may observe that in the great majority of non-neuralgic cases in which blisters are used, they are used for the purpose of subduing local *inflammation*, and therefore that a consideration of their *modus operandi* affords no confirmation of Dr. Anstie's "idea." The irritation caused by blisters is conveyed to the sensory nerve-centres of those nerves which have been excited; a fresh afflux of blood is induced in those centres; the excitement spreads throughout the neighbouring nerve cells; those presiding over the nutrition of the part where the blister is applied flash back from the centre to the periphery the excitement in which they are sharing, and light up the previously normal processes of textural life into intense local inflammation with its consequence—copious serous effusion. During the period of centric hyperæmia thus induced, a change in the nutrition and therefore in the function of the sensory centre related to the painful nerve is likely to be effected, and in some rare cases the morbid condition of that centre on which the pain depends may be carried away as the preternatural afflux of blood temporarily induced there subsides, just as chronic inflammation of a part is often cured by the application of a caustic which produces an acute inflammation in which the chronic one is merged, and which, itself ceasing, causes the disease to cease with it. Generally, however, as the tumult in the nervous centres and at the seat of the blister subsides, the morbid condition which it was intended to overcome is found to be still existing, to have been only masked or obscured meanwhile, and too often to be intensified by the very process intended to effect its destruction; for the capacity of variation or

irregularity of the circulation of the blood in the nerve centres acted upon has been increased, and the more this is increased the greater the possibility of their functional disturbance, and therefore of pain.

As blisters are both very distressing and very weakening, it seems that if they are liable to fail as palliatives, and if they never cure, the expediency of their use in the treatment of neuralgia is extremely questionable. Dr. Anstie's concluding remark on blistering appears to me especially judicious. "On the whole," he says, "it is a remedy not well fitted to be applied to aged subjects; and in its severer forms it should never be applied to patients who are greatly prostrated in strength, for it must be borne in mind that the remedy may miss its aim of relieving the neuralgia, in which case it is necessary to remember, more accurately than many practitioners appear to do, *what a very serious element of misery and prostration will be introduced into the case by the vesication itself*" (p. 195). These words which I put into italics, represent, I believe, the chief result obtained from blistering neuralgic patients; and the weighty opinion of Trousseau in this matter cannot fail to command great deference. He says: "From Cotugno, who recommended with such confidence the application of blisters in sciatica, over the selected spots, the buttock, the head of the fibula, and the malleolus externus, down to Valleix, who regarded blisters almost like a panacea, practitioners have used them constantly in the treatment of neuralgias, although I think that they have owed their favour to the extreme facility with which they can be used, for I cannot believe in the exaggerated praises which have been accorded to them for a century."

The Actual Cautery.—The application of red or white-hot iron to various parts of the surface of the body, and especially along the spinal region, has often been tried as a remedy for neuralgia. Dr. Anstie remarks that the skin should be lightly brushed over with the *white-hot* iron, "so as to make an eschar *not followed by suppuration*." He adds, "The galvano-cautery (Stöhrer's Bunsen) is the best for the purpose, but I have made the flat-iron cautery serve very well." In two cases this method has yielded him "very good palliative results" (p. 228). I have no personal experience of this very unpleasant process; I have, however, seen several patients who have submitted to it: one of these is a lady, whose back along almost the whole of the spinal region is disfigured by scars, the impressive witnesses of the "heroic treatment" she has undergone; but I have yet to learn of even a solitary case in which a cure has been effected by this agent of torture.

Acu-puncture and Electro-puncture, are sometimes used in the treatment of obstinate neuralgias. Trousseau resorted to each of these painful processes; and Brown-Séquard, while assert-

ing that they are "very useful against neuralgia," expresses the opinion that as remedies for various neuroses, they "are certainly too much neglected in our time."*

Cyanide of Potassium.—A solution of this salt applied on the skin protected by its epidermis gives, says Trousseau, "pretty good results when the affected nerves run superficially, as in the face and on the scalp. The strength of the solution should be of one part of the salt to eighty of water (one drachm to ten ounces). A compress doubled up several times is steeped in the solution and applied over the part; a piece of oil-silk is then laid over, and the whole kept in place by a handkerchief. Each application should last from half-an-hour to two hours, and should be renewed three or four times every twenty-four hours. This method offers great advantages, but it has disadvantages also. Pure cyanide of potassium is a caustic, and causes a certain amount of irritation, even when dissolved in eighty parts of water, producing bright redness of the skin, and then a vesicular or papular eruption, which sometimes gives rise to such discomfort that the treatment has to be given up. A greater disadvantage of this solution is that, like strong alkalies, it makes the hair break easily, and turns them of a rusty colour, which disappears only when the hair has grown again. *Chloroform*," adds the same physician, "may be used in nearly the same circumstances as cyanide of potassium, but it should never be applied in a pure state, at least on the face, and on parts which are habitually uncovered, because it gives rise to considerable irritation, and even vesicates sometimes. It may then act on neuralgias by revulsion, in the same manner as flying blisters, sinapisms, and the application of tincture of iodine."

Veratrine, according to my experience of it, is almost valueless. The ointment of it certainly often affords some relief, but it is generally slight, and after its use, in cases where it does relieve, the pain returns in full force. Dr. Anstie's experience of it seems to have been more fortunate. He has found "mild veratrine ointment extremely useful as an adjunct to other treatment, in migraine and supra-orbital neuralgias of suckling women, and of chlorotic girls." He has also seen it do much good in mammary neuralgia.

Irritation is also induced by the application of ammonia (in the form of liniment and ointment), tartar-emetic ointment, croton-oil liniment, iodine liniment, mustard plasters, &c. But obviously if any of these excitants, or of those previously mentioned, whether applied at the seat of pain, or at some distance from it,

* "Lectures on the Diagnosis and Treatment of Functional Nervous Affection." Part I. P. 56.

had been proved by extensive experience to possess the virtue ascribed to it by its especial advocate, its efficacy would long ago have ensured for it the practical recognition of the Profession, which, though notoriously slow in recognising the value of new remedial agents, and in effecting manifestly practicable and urgently needed therapeutical reforms, nevertheless does so sooner or later; and I incline to think that each of these remedies has been so often and so thoroughly tried as to justify the condemnation which the great majority of medical men have practically pronounced upon them, viz., abandonment. If Valleix's results from the use of blisters at the seat of pain—viz., thirty-nine cures out of fifty-two cases, could be generally realised by other physicians, they would scarcely care to seek for another remedy, but would gladly content themselves with the one so pre-eminently reliable, and would account as incurable the few cases of neuralgia which it failed to cure. As a matter of fact, however, it, together with the other local excitants which have been tried again and again, have so constantly disappointed the hopes of those who have prescribed them, that new and really effective remedies are still anxiously sought for.

Opium and Morphia, applied locally, exert a powerfully sedative influence, and no doubt the palliative effects of hypodermic injections of morphia are partly those of a local anæsthetic.

Aconite, applied externally, is, I think, the best sedative of the peripheral extremities of sensory nerves which we possess; and, fortunately, it can be applied during long periods together, so that its benumbing influence can be maintained persistently without producing constitutional injury. I have often used this powerful drug with marked benefit as a palliative. It has not, in my hands, proved curative; but, as is well known, Sir Thomas Watson has reported a case in which the application of *aconitine* ointment effected a permanent cure.

Chloroform, applied in the form of a liniment, about one-third only of which consists of chloroform, also exerts a sedative influence which, according to Trousseau, often proves beneficial "in neuralgias of no great intensity, and especially when they are superficial."

I have said at p. 269 that *Hydrate of Chloral* "is useless as a pain-destroyer, except by virtue of its sleep-inducing power;" but I have since learnt that it has been applied locally, and, as it seems, with considerable success by Dr. Strother, of Boston, U.S. A saturated aqueous solution is applied over the seat of pain, and glycerine, olive oil, or cream is used as a subsequent dressing. It is said that in most instances enough of the chloral is absorbed to produce a considerable anodyne effect, in addition to its rube-

facient action. I have made no experiments with this substance applied locally; but on the same day in which I read in the *Medical Times and Gazette* of Dr. Strother's experience of it, I heard of an English lady who had suffered during eight years from neuralgia, and who had received signal benefit from hydrate of chloral applied at the seat of pain—*but without any friction.* In this case, probably, the action was simply that of an anodyne.

Belladonna and Atropia.—As remedies for neuralgia, Trousseau assigns to these substances a rank so relatively high, and his directions how to use them are so explicit, concise, and valuable, that I am tempted to transcribe all he says about them. "When the neuralgia is superficial, and is, for instance, seated in the temples, the forehead, or the scalp, belladonna or atropia, applied locally, is sufficient in a pretty large number of cases. Solutions of atropia have the great advantage of being very powerful, and of not messing the clothes or the skin. I generally use the following formula :—

℞ Atropiæ sulphatis, gr. v.
Aquæ distillatæ, ℥iij. Solve.

Compresses steeped in this solution are applied over the painful parts, and covered over with a piece of oil-silk so as to prevent evaporation, and the whole is kept in place by a bandage or a handkerchief. The application is renewed several times in the twenty-four hours, and continued for at least an hour each time.

"The efficacy of this solution varies in different individuals, so that the dose of atropia should be diminished or increased, according to the effect produced. When there is considerable impairment of sight and dryness of the throat, the quantity should either be diminished or the application be less frequently renewed. On the other hand, when the absorption of the drug is marked by slight phenomena, while the pain is not relieved, the dose should be increased, and the compresses applied almost continuously. When the neuralgia occupies a very limited area, a much more concentrated solution of atropia should be used, namely, three grains of atropia, dissolved in about half-an-ounce of water, with the addition of a small quantity of alcohol; this should be used in drops rubbed on the part with the finger. This is done two or three times in an hour, and a very powerful effect is often obtained in this way. When the neuralgia affects the scalp, and involves the occipital nerve, for instance, the roots of the hair and the scalp should be well wetted, and absorption then takes place with very great facility. A solution of atropia, applied locally, is pretty successful also in neuralgia of the superficial cervical plexus, but is not so useful in intercostal

and brachial neuralgia, and loses all efficacy in neuralgia of the lumbar plexus of the sciatic nerve, and of the abdominal viscera. Yet, you must not think that it is always useless in such cases. The extract of *Datura stramonium*, and of *Belladonna* may be substituted for the atropia. Formerly, ointments made with axunge or cerate were used; but the fatty matters diminished the rate of absorption so much that the treatment was often useless. Glycerine and starch are now used instead, and when the extract is mixed with them, in the proportion of one-third or of one-fourth, a paste of the consistency of an ointment is obtained, which offers the great advantage of spreading easily on the skin, and of being soluble in water, so that if a piece of wet lint covered over with oil-silk be laid over it, the skin is placed in the most favourable condition for absorbing the remedy. As good results are obtained in this way as with atropia; and, although the skin of the face, and of the throat, and the hair may be a little soiled, the mixture offers immense advantages in regions to which soothing fomentations or poultices may be applied, such as the walls of the chest, the abdomen, and even the limbs. In a word, since this combination has been more frequently used in practice, there has been a greater proportion of cases in which alleviation, if not the cure, of pain, has been obtained, whether the pain were merely neuralgia, or were due to an organic lesion, or even a local inflammation."

Referring to the hypodermic administration of atropia, Dr. Anstie reports that the most remarkable effects which he has experienced from it "were obtained in cases of peri-uterine neuralgia, especially dysmenorrhœal neuralgia. Speaking generally of atropine, it must undoubtedly be counted far inferior to morphia as a speedy and reliable reliever of neuralgic pain, but for all pelvic neuralgias it appears to me on the whole to surpass morphia. And besides this, in other neuralgias, where opiates altogether disagree (as with some subjects they do), it is not uncommon to find that atropia acts with exceptionally good effect. And to some extent I am inclined to confirm Mr. Hunter's opinion, that where atropia does stop neuralgia, it does so more permanently than morphia" (pp. 188-9).

Warm baths.—The only writer on neuralgia I am acquainted with who duly appreciates the value of warm baths as aids in the treatment of the disease is Trousseau; and his expression of appreciation is confined to a single line. In his list of remedies for neuralgia he mentions "warm baths of very prolonged duration." These last four words contain the secret of their worth; and from a large experience of their use I can say with confidence that if they are used once, or even twice, a day during not less

than an hour each time, the temperature of the water being maintained steadily at 98° F., meanwhile, they are, in the great majority of cases, of immense value. While contributing in a powerful degree to allay pain, they equalize the circulation throughout the body, and soothe the whole nervous system simultaneously, and thus often aid in the removal of various morbid states which, in many cases, operate either as causes or maintainers of the pain itself.*

ELECTRICITY.—If the nature of the physiological action of the several kinds of electricity were accurately understood, and if the pathology of neuralgia, instead of being, as it still is, a sphere of more or less chaotic conflicts of opinion, were one of scientific agreement, it would not be difficult to form definite conceptions, *à priori*, of the probable efficacy, both absolute and relative, of the several kinds of electricity as remedies for neuralgia, and to obtain by experience a correct estimate of the remedial potency of each. But as matters now stand, some of the most authoritative writers on neuralgia avow that they have no definite idea of what constitutes the immediate cause of the disease, and others, though espousing definite ideas on the subject, differ widely from each other concerning it, while even those whose therapeutical endeavours are directed by definite pathological views have no guidance but empiricism in selecting the kind of electricity to be employed, and in applying the one selected according to one method rather than another.

Respecting *Static Electricity, Faradisation, and the Interrupted Galvanic Current* I shall say nothing here, because all trustworthy experience is tending to establish the conclusion that, whatever may be the worth of Remak's theoretical views concerning the physiological action on the nervous centres of the constant galvanic current for which he first obtained thorough recognition by the profession, it is certainly displacing the other forms of electricity as a remedy for neuralgia, and is doing so because for this purpose it is found to be incomparably superior to them.

The Constant Current.—Seven years ago Dr. Althaus stated† that "we may often cause the iris to contract" by directing a

* The immensely beneficial influence derivable from the systematic and prolonged use of warm baths in the treatment of diseases of the nervous system, is thoroughly appreciated and exemplified in a remarkable treatise, published nearly thirty years ago, "On Irritation of the Spinal Nerves as the Source of Nervousness, Indigestion, Functional and Organical Derangements of the principal Organs of the Body, and on the Modifying Influence of Temperaments and Habits of Man over Diseases, and their importance as regards conducting successfully the Treatment of the latter; and on the Therapeutic Use of Water." By J. Evans Riadore, M.D., F.L.S. London: 1843.

† In the *Lancet* of August 12, 1865.

continuous galvanic current "of large quantity to the lower cervical and upper dorsal vertebræ;" and that "by applying a continuous current to the lumbar portion of the spine we may cause a glow in the legs and feet, without any direct application to these latter." And in 1866 I received a letter from a friend in Paris containing the following question:—"Have you seen anything of M. Lefort's discovery of galvanising the spine in cases of syncope?" Now, if the pupil could be made to contract by directing the continuous current to the cilio-spinal region; if a glow in the legs and feet could be produced by applying a like current to the lumbar portion of the spine; and if a person could be rapidly recovered from syncope by "galvanising the spine," a very important clue to the understanding of the physiological influence of the constant current on the nervous centres would have been gained. For, as we know that all the effects in question are effects of the vital depression of the sympathetic nervous centres related respectively to the iris, to the arteries of the lower extremities, and to the arteries of the brain, the production of those effects by the constant current, applied as stated, would constitute very strong evidence that it is capable of lessening the functional energy of the spinal cord, and of the collateral ganglia of the sympathetic. I have, therefore, watched with eager interest for the publication of reports of further observations confirmatory of what seemed likely to be an important discovery. But since 1866 no further information on the subject has been forthcoming; my own experiments in galvanising the spinal region have yielded negative results; and, on searching the second edition of Dr. Althaus's treatise on "Medical Electricity," published in 1870, I find no repetition of the statement which he made in reference to it in 1865, and no vestige of evidence justifying the expectation that the observations in question are verifiable by other experimenters. But on the contrary, Dr. Althaus expressly says, concerning the continuous galvanic current, that "its mode of action on the nervous system, when this is in a state of disease, remains at the present time more or less matter of hypothesis" (p. 428).

"Remak began," says Eulenberg, "with the application of the constant current in the treatment of neuralgias from the two-fold point of view, that, on the one hand, by virtue of its catalytic effects, it removes various irritations which affect the nerves injuriously; and, on the other, that it may excite a sedative influence on the nerve fibres. He therefore recommended the constant current, and, indeed, in the form of stable downward-directed streams, especially in the first place, in rheumatic neuralgias, as he supposed their causes to consist in inflammatory and exudative changes in the neurilemma. Later, Remak believed that in

neuralgias of the head the cervical sympathetic must be considered as the point of origin, and that, similarly, in neuralgias of the neck and trunk, the spinal cord and sympathetic ganglia are the focus of the disease, and he sought, therefore, according to his etiological view, to localise the constant current upon these structures."*

Eulenberg thinks there is a large measure of truth in Remak's conception of the mode of action of the constant current, but suggests further and important explanations on the subject; as, however, these explanations, like those of Remak, are in great measure hypothetical, though possessing a high degree of probability, I shall not reproduce them here. But though, as yet, very little is positively known concerning the nature of the immediate action of the constant current on the nervous system, our ignorance of it is no bar to our appreciation of its therapeutic effects, and, referring to the experience of them by different observers, I shall endeavour to estimate them as fairly as I can.

My own experience affords me no data from which I can fairly judge of either the absolute or comparative value of the constant current; for though I have used it carefully and persistently, and have applied it in each of the various ways in which it is employed, I have only done so in very severe and very chronic cases, in which the application of the Spinal Ice-bag, after producing great amelioration, had not effected a cure. In these cases I have obtained some slight, but only temporary, benefit from the application of the constant current by means of Stöhrer's battery. It is possible that had some of the cases which I have treated successfully chiefly by means of the Spinal Ice-bag been treated by the constant current, a satisfactory result would have been obtained; and that such would have been the case seems probable from a consideration of the reports of various experimenters who have used, and have depended on, this agent much more than I have done.

Referring to the treatment of "painful affections," by means of the continuous galvanic current, Dr. Russell Reynolds remarks: "I know of nothing more distinct or more satisfactory in therapeutics than the relief which may often thus be given to suffering of the most intense character, the relief being very rapidly induced, and in many cases permanent."† Dr. T. C. Allbutt, of Leeds, also speaks of the continuous current as a remedy for neuralgia in terms of strong commendation. Dr. Anstie, who during the last three years has, he says, "become more fully acquainted with the researches of foreign observers, and with the help of these indications" has been able to apply himself "more

* *Op. cit.*, p. 81.

† "Lectures on the Clinical Uses of Electricity." London: 1871. P. 97.

fruitfully" to his "personal inquiries into the matter," has obtained results which justify him, he thinks, in saying, "The constant current, as I now estimate it, is a remedy for neuralgia, unapproached in power by any other save blistering and hypodermic morphia, and even this latter is often surpassed by it in permanence of effect, while it is also applicable in not a few cases where blistering would be useless, or worse than useless." * Dr. Althaus gives no summary of his experience of the effects of the constant current; but the general impression made upon me by reading his section respecting the use of it in the treatment of neuralgia is that his successes are largely intermixed with failures. Referring to ordinary but severe facial neuralgia, he says: "As a rule," it "defies every medicinal treatment, and only appears to yield to neurectomy, and the continuous galvanic current;" and adverting to that severe form of facial neuralgia which Trousseau has appropriately termed *epileptiform neuralgia*, he says: "I believe that in this affection the continuous current is preferable to neurectomy;" and, again, "in sciatica faradisation as well as galvanism generally prove successful;" but, he adds, "it is sometimes advisable to combine them with subcutaneous injections of morphia and atropia."† Perhaps the most authoritative and reliable opinion concerning the anti-neuralgic effects of the constant galvanic current is that of Eulenberg, who, as rightly observed by Dr. Anstie, "is a sober and dispassionate writer on the effects of electric treatment in general." This eminent physician sums up the results of his experience as follows:— "The effect of the constant current as a palliative is often strikingly manifest, and in this respect is only surpassed by the results of the subcutaneous injections of morphia. Far more dubious, however, is its efficacy as a curative agent; and supported, as I am, by a sufficiently great number of experiences, I venture to maintain this opinion in opposition to the far too sanguine statements of enthusiastic galvano-therapeutists. Peripheral neuralgias induced by slight traumatic and rheumatic causes, as well as those which originate in idiopathic neuritis, are those in which the results of galvanic treatment are the most favourable. Those neuralgias which originate in pathological processes in the neighbourhood of nerves, diseases of bones, morbid growths, &c., are either not at all, or only in the rarest cases, removable by galvanic treatment alone. Most of the cures effected are cures of those neuralgias which are really not neuralgias at all, but which would be far more correctly designated as myalgias, arthralgias, &c., of rheumatic or traumatic origin. In the treatment of neuralgias of centripetal origin by galvanism, real cures are also doubtful, and in any

* *Op. Cit.*, p. 200. † *Op. Cit.*, pp. 551-3, 565.

event rare ; palliative effects, on the contrary, are as brilliant as they are numerous."*

Neither Dr. Russell Reynolds, nor Dr. Allbutt have, so far as I am aware, published any report of their experiences of the treatment of neuralgia by the constant galvanic current, or any estimate of its curative power, compared with that of other remedial agents, but it clearly seems that they have formed a decidedly favourable opinion of it. Seeing that as a remedy for the severe form of facial neuralgia, Dr. Althaus places it by the side of that formidable alternative—neurectomy, and only *believes* that galvanism is preferable to it ; and seeing that in the treatment of other neuralgias—sciatica for example—by means of the constant current he finds it "sometimes advisable" to combine with it subcutaneous injections of morphia or atropia, I infer that his experience of the anti-neuralgic effects of the constant galvanic current are substantially accordant with those of Eulenberg. Dr. Anstie admits that its remedial power is approached by blistering and hypodermic injections, but adds that it often surpasses the latter in permanence of effect. Now, as we know pretty accurately within what narrow limits the *curative* power of blistering and hypodermic injections is restricted, we are enabled to form a fairly correct estimate of Dr. Anstie's experience of the *curative* power of the constant galvanic current. In short, when his evidence is duly scanned, it is found to differ from that of Eulenberg much less widely than appears at first sight, for by close examination we see that the difference is narrowed down to one point : whereas Eulenberg says the beneficial effects of the constant current are only surpassed by those of the hypodermic injections of morphia, Dr. Anstie says the beneficial effects of hypodermic morphia are often surpassed by those of the constant current. And, perhaps, as it is only within the last three years that Dr. Anstie has especially applied himself to the study of the anti-neuralgic power of the constant galvanic current, increasing experience may ultimately lead him to concur entirely in the opinion of it expressed by Eulenberg, "in opposition," as he says, "to the far too sanguine statements of enthusiastic galvano-therapeutists."

Those practitioners who make use of this remedy will find Stöhrer's battery† an especially convenient one. "Concerning the intensity of the current, the duration and number of the applications, &c., it is scarcely possible," as Eulenberg justly says, "to give general directions, for the difference from each other of the

* *Op. cit.*, pp. 82-3.

† It may be obtained of Krohne and Sesemann, Duke street, Manchester square.

several nerve regions, or of the parts to which the galvanism is applied, and also the differences of individual susceptibility, necessitate differences in the application of the current in different cases. As a general rule the sittings should not be too short (five to ten minutes), and ought to be repeated daily, rarely at greater intervals."

This remedy is unfortunately open to one great practical objection, which is thus indicated by Dr. Anstie : "It is a weapon I seldom employ in the first instance, for many reasons, the principal of which is the costliness of the proceeding to the patient ; either the physician must personally administer the remedy daily, often for a considerable period, or he must make the patient provide himself with an expensive battery ; and in the latter case there is, after all, the unsatisfactory consideration that the application (even after the most careful directions have been given) will perhaps be unskilfully and inefficiently made" (p. 211).

Division of the chief artery at the seat of pain.—Trousseau resorted empirically to a remarkable expedient in some cases and with a temporary success he could not, as he says, account for, and which I regard as sedative in its action—viz., division of the chief artery at the seat of pain. By this operation the affected nerve is suddenly deprived of its wonted and direct supply of blood, and until, through indirect channels, it has again attracted to itself a fresh abundance, it is rendered less vigorous than before.

Division or Excision of Nerves, and Amputation, have been practised for the cure of neuralgia, but with results very far from encouraging a recourse to any one of these expedients, except in cases of extreme suffering, for the relief of which every other remedy has been tried in vain. Moreover, it is only in cases of neuralgia of the fifth nerve that neurotomy or neurectomy can be practised without causing motor paralysis at the same time. This consideration alone constitutes a grave objection to either operation, unless when the fifth nerve alone is in question ; but the greatest objection to these operations is the extreme rarity of the cases in which they effect a cure. As Romberg wisely observes, "The value of this method is at once determined by the neuro-physiological law of eccentricity ; according to which the central end of the divided nerve, if only the hundredth part of an inch in length, when irritated, causes the pain to be felt down to its extreme cutaneous distribution." If this docrine be true, neither excision nor amputation can ever be relied on as a means of effecting a permanent cure of neuralgia. Eulenberg affirms, however, that both neurotomy and neurectomy may occasionally be resorted to with advantage. He says,—"There are the best chances of success in cases of neuralgia of peripheral origin, the nerve being divided or resected on the

central side of the seat of pain. But even in such cases the effect is very often not permanent, because through regeneration the sensory conduction, and most generally along with it the neuralgia are re-established. The *restitutio in integrum* of the sensory conduction appears generally to follow simple division much more rapidly than it does excision of a piece of the nerve. After the former, therefore, the pain is observed to recur in three or four months, but after the latter rarely until six or eight months have elapsed, and sometimes even not until after a year or more of respite. The majority of surgeons express themselves therefore most in favour of neurectomy. It must, however, be borne in mind that while this operation affords greater security against the return of the pain, it also involves greater difficulty and greater danger than does simple neurotomy: in many cases the latter may be accomplished subcutaneously and almost bloodlessly, and can be repeated with equal ease if its repetition should be rendered necessary by a return of the pain. These considerations have induced some surgeons to give neurotomy the preference." Even in those cases in which he recognises that the neuralgia has a central seat this physician believes that the operations in question may prove beneficial. He accounts for the palliation or cure effected in these cases by supposing that just as a nerve-wound may produce a central change, followed by neuralgia, so the impression conveyed to the affected sensory centre consequent on division, or excision, of a part of the affected nerve may cause such a profound alteration of that centre as to result even in the actual cure of the disease.

"The mutilating operations on the extremities—amputations and exarticulations—are only to be registered in the therapy of neuralgia," Eulenberg justly remarks, "as barbarous anachronisms." In no case that I am aware of has either amputation or exarticulation proved successful. Romberg cites a case related by Mayo, in which, in consequence of intense pain in the knee of a woman, amputation of the thigh was performed: it proved useless—the pains continued. And Sir Charles Bell relates an extraordinary case, in which a young woman, at Middlesex Hospital, had a like operation performed on account of pain seated in the knee and extending down to the heel. "On the healing of the stump, the same pain was felt still as if in the knee and heel and side of the foot." The extremity of the bone and cicatrix were then cut off, but without relieving the severe paroxysms of pain. The popliteal nerve in the back part of the stump was next divided: the pain, however, continued. Finally, the limb was taken off at the hip-joint! Sir Charles Bell, who was consulted at each step of the mutilation of this woman, opposed the amputation of the thigh; and, though he "had no objection" to the cutting off "the extremity of the bone and

cicatrix," he protested, in writing, against taking off the limb at the hip-joint, and says: "As to the cure of the pain, who, in reading these cases, can have hopes of benefit?"*

In the foregoing summary review of the chief remedies hitherto used in the treatment of neuralgia, I have endeavoured, with due deference to the often differing evidence tendered respecting the merits of each of them, to indicate impartially the general experience and judgment of the Profession concerning them. If in this attempt I have made a fair approach to success, it clearly appears that, while the pathology of neuralgia is still an arena for the conflict of not only diverse, but diametrically opposite doctrines, the therapy of this disease is extremely chaotic and, in a large proportion of cases, deplorably impotent. There is, therefore, ample scope for any one intent on increasing our therapeutical influence over the malady, and, with this conviction, I feel no need to do more than refer to the above review as my apology for inviting the attention of the Profession to a new remedy for neuralgia.

THE NEURO-DYNAMIC TREATMENT OF NEURALGIA.—In an essay on "The General Principles of Neuro-Therapeutics," forming the Introduction to my work entitled "Sea-Sickness and how to Prevent it," I have explained the physiological and therapeutical doctrines on which the method of treating neuralgia I am about to describe is founded. It is my intention to publish a separate work explaining those principles more fully than I have hitherto done; but, until that intention is fulfilled, I must refer my readers to the essay just mentioned for an exposition of them. I shall henceforth designate those principles, together with the practice founded upon them, by a term which seems to me more accurately expressive of their character than is any other I can think of, viz., *Neuro-Dynamic Medicine*.† The following is a summary statement of the principles in question:—

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* "The Nervous System of the Human Body." Case 91, p. 365.

† In every case in which Spine-bags are employed remedially the chief and essential feature of the influence exerted is *force*—δυναμις. Expansion and contraction of blood-vessels, whether in the nervous centres themselves by direct action, or in the periphery of the body by indirect action, are the primary effects produced by modifying the temperature along the spinal cord; and in every case in which a patient is cured or benefited, the cure or melioration is a secondary consequence of those primary effects. As both *heat* and *cold* are employed, the phrase "Ice-treatment" conveys only a partial idea of the method, and none of the principle, of treatment. The term *neuro-dynamic* seems to me at once the most accurately descriptive, the most simple, and the least objectionable of any term I know; and being applicable as a generic name for all those processes which consist in modifying the activity of textural nutrition, whether local or general, by the use of heat and cold applied locally, hot and cold water baths, hot-air baths, and the various forms of electricity, it is for this reason, as it seems to me, additionally valuable.

1. That the chief function of the sympathetic nervous system consists in regulating the diameters of the blood-vessels throughout the body.

2. That when the sympathetic ganglia are in a state of maximum hyperæmia, the nervous effluence from them to the muscular coats of the arteries to which they are severally related stimulates them so excessively as to induce in them a condition of tonic spasm—a spasm so intense as to result in shutting off the blood altogether from a large proportion of the peripheral arteries.

3. That when the sympathetic ganglia are in a state of maximum anæmia, the nervous effluence from them to the muscular coats of the arteries to which they are severally related becomes so extremely feeble that a condition resembling paralysis is induced; the muscular coats of the arteries become, consequently, extremely relaxed, and, as the blood flows in the direction of least resistance, the parts supplied by the arteries in question become suffused with blood to an excessive degree.

4. That when the spinal cord is in a state of hyperæmia, cramps of the involuntary muscles surrounding the alimentary tube, cramps, or even convulsions, of the voluntary muscles, an excess of glandular activity, and an excess of sensibility (hyperæsthesia) are likely to ensue.

5. That every gland and glandular follicle in the body is under the control of one motor nerve (which I call the *positive motor*) emerging from the cerebro-spinal system, and distributed to its secreting cells in order to regulate its functional activity; and of another motor nerve (which I call the *negative motor*) emerging from the sympathetic system, and distributed to its artery or arterial twig in order to regulate its blood-supply.

6. That in the same manner as glands are supplied with positive, as well as with negative, motor nerves, so, there is reason to believe, every tissue of the body is thus supplied, and is thus placed and sustained in a state of eclectic affinity for the elements of the blood requisite for its nourishment and functions.

7. That the sympathetic ganglia and the spinal cord can be rendered hyperæmic or anæmic artificially, by means of heat in one case and cold in the other, applied along the spine.

8. That cold applied along the spine will subdue cramps or excessive tension of both voluntary and involuntary muscles, will lessen sensibility, will lessen secretion, and while increasing within certain limits the general circulation and bodily heat, is capable by prolonged use of lessening textural nutrition.

9. That heat applied along the spine will (in some cases) induce cramps of both voluntary and involuntary muscles, will increase sensibility, will increase secretion, and will lessen the general circulation and bodily heat.

The truth of these propositions is, I believe, fully established by the evidence adduced in the essay from which they are quoted; and assuming it to be so, it is to be expected (according to proposition 8 and that part of proposition 9 consisting of the statement, "that heat applied along the spine will lessen the general circulation") that by means of the proper application of cold and heat along the spine a remedial power over neuralgia and its kindred disorders far greater than is conferred by any of the agents already passed in review is now within our reach. The chief phenomena of neuralgia and its complications consist, as has been shown, in pain; in disorderly action of voluntary muscles; in various morbid states which are produced by disorderly action of involuntary muscles—especially of those surrounding arteries; in disorderly action of glands; and, finally, in disorderly processes of local nutrition. Now, I have demonstrated that all these morbid conditions are results and expressions of morbidly-excessive action of the nervous centres functionally related to the several organs or structures in which those conditions obtain; and, as already intimated, I have ascertained that this excessive action can be subdued by suitably modifying in each case the temperature of some part or the whole of the spinal region. I must, however, advert to this last point more particularly here.

That *sensibility can be lessened* and that *pain can be abolished by exerting a sedative influence over the spinal cord* chiefly by means of ice, is proved conclusively by my own experience, which has been considerable, in the treatment of neuralgia. The reports of the cases given hereafter contain ample evidence of the truth of this statement; and I may mention here that in the course of the discussion on a paper on neuralgia which I read to the Harveian Society, November 21, 1867, Dr. Drysdale, "after observing that he was known to be sceptically inclined, but that he must confess to having recently witnessed in two cases the efficacy of Dr. Chapman's therapeutical method," described to the Society two cases of neuralgia which were under his own care at the Farringdon Dispensary, and which, having been treated according to my recommendation by means of the Spinal Ice-bag, were cured, he said, by the use of it without the help of medicines.*

Disorders of the voluntary muscles of a spasmodic or convulsive character are powerfully counteracted by the Spinal Ice-bag. I have thoroughly proved this in respect to each of the several forms of morbid muscular contraction, and I have collected a large amount of evidence to the same effect consisting of the statements of a considerable number of medical men. This evidence will be found in the essay already mentioned.

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* *Medical Press and Circular*, December 11, 1867.

Disorders of the involuntary muscular structures, consisting of excessive contractions or tonic spasms, as well as of the morbidly-excessive relaxation of the same structures, are controllable to an astonishing degree by means of the Dynamic method of treatment. My writings teem with facts proving the truth of this assertion. The whole of the morbid phenomena of the involuntary muscular structures associated with neuralgia denote diminution of vitality—privation of life—within the area where any of those phenomena are observable. And certainly at first sight the proposition that these morbid states which are negations of life, are most effectually remedied by the negative, depressing, or sedative influence of cold is somewhat startling, and seemingly paradoxical; nevertheless, it is true. As shown in Chapter III., all these phenomena, though in themselves negative, are expressive of a positive condition—a condition of excess, or *hyper*æmia in the vaso-motor nervous centres functionally related to the affected parts; and when it is borne in mind that it is not to these peripheral parts which are in a negative state, but to those centres which are in a positive state that the cold is to be applied, the treatment not only becomes intelligible, but is seen to be thoroughly scientific, and therefore likely to be most successful. And as a matter of fact the cold and pallid surface of the neuralgic area can be made warm, and can have the hue of health re-imparted to it by the application of ice to those centres. In like manner normal feeling can be restored in those cases in which the anæsthesia which obtains is due to the cause in question. Amaurosis, too, when due to the same cause, is also, in fact, a form of anæsthesia—anæsthesia of the retinal expansion of the optic nerve; and this anæsthesia, or loss of the feeling of light, when not so inveterate as to have become established in atropy of the perceptive organ as its abiding cause, may be abolished by the same Dynamic method of treatment, which is also wonderfully effective in remedying the partial atrophy and enfeeblement of voluntary muscles, sometimes existing within the neuralgic area, the troublesome constipation of the bowels, and several other disorders, at once complicating many cases of neuralgia, and originating in excessive energy of the vaso-motor nerve-centres.

Disorderly and excessive action of glands or of glandular surfaces may also be corrected by the exertion of a sedative influence over the nervous centres functionally related to them. The wonderful action of heat properly applied over the cilio-spinal region in arresting the copious nasal secretion which occurs during an attack of influenza or of a common "cold" is only credible, perhaps, at present by those who witness it. The idea as well as the practice of lessening secretion by lessening the circulation of blood in the nervous centres is so new to the Profession, that I

think it expedient to transcribe from the essay already quoted the following paragraphs :—

"Morbidly-excessive sweating, bronchorrhœa, the excessive action of the alimentary mucous membrane constituting the chief cause of diarrhœa, excessive action of the kidneys, leucorrhœa, and spermatorrhœa, I have restrained over and over again by cold properly applied to the appropriate part of the spine. In proof of the efficacy of the Spinal Ice-bag in cases of morbidly-excessive sweating and of bronchorrhœa, I am enabled to cite the evidence of Dr. J. B. Hewitt. Respecting a case of delirium tremens which he treated (in February, 1868) by means of the Spinal Ice-bag, he says,—'I found the patient [before ice had been used, and after drugs had proved of no avail] pale, tremulous, *sweating, with a cold, clammy skin*, and great exhaustion marked on his face. . . . . In the evening [after the Ice-bag had been applied two hours] I found him *free from the slightest trace of sweating*, the surface was of a uniformly good temperature, the pulse had lost all its feebleness,' &c., &c. The same physician states that in the case of a man suffering from chronic bronchitis, and who was treated by the Spinal Ice-bag, '*there was considerable diminution in the amount of expectoration* and in the severity of the cough during the application of the ice ; and it was remarked to me by the patient that he had only coughed twice during the three hours he was under treatment.' That ice along the spine will stop diarrhœa and, therefore, the excessive action of the intestinal mucous membrane, is an established truth, in confirmation of which I may cite the testimony of Dr. Lake, Dr. Griffin, Mr. Bencraft, Mr. Williams, and Dr. J. Waring Curran, already mentioned ; also that of Dr. Moorhead, of Weymouth, Dr. Fitzgibbon, of the West India steamship, *St. Thomas*, Dr. J. S. Hackett, of New Amsterdam, Berbice, British Guiana, Dr. Munro, of Melrose, and Dr. Wilson, of Philadelphia. The fact that excessive secretion of urine may be arrested by the Spinal Ice-bag has not yet been observed, I believe, by any one besides myself ; but, nevertheless, it is a fact, as real as any of those in proof of which I am able to adduce the testimony of several medical witnesses. That ice exerts a restraining power over the morbidly-excessive secretion of the spermatic glands I have proved in several cases ; Dr. de Faye has kindly sent me particulars of his successful treatment of a case in the same way ; Dr. Ramsey, when visiting me, told me that he had verified my statement of the efficacy of the Spinal Ice-bag in this disorder ; and a young medical man from Dublin, who called upon me recently, informed me that in one of the hospitals there (I forget the name of it) this affection had been treated with success by the same method.

The arrest of the excessive secretion constituting leucorrhœa

by means of the Spinal Ice-bag was effected for the first time in a case treated by me in 1863. Since that time, my successful treatment of a large number of cases of the same malady by the same method assures me that the action of the mucous surfaces of the female reproductive organs is no less completely under the direction of the spinal cord than is that of the other secreting structures already adverted to. But as yet I know of only three medical men besides myself whose experience enables them to confirm my statement that leucorrhœa may be cured by lowering the temperature, and thus lessening the activity (generally the *reflex* activity) of the lumbar segments of the spinal cord. Dr. Hayle, referring to 'a case of chronic metritis,' wrote to me (July 2, 1865), 'a transparent yellow discharge from the uterine cavity, which the patient had had for years, has been nearly arrested.' Dr. Drysdale stated to the Harveian Society that one of his patients at the Farringdon Dispensary, who was suffering from neuralgia and at the same time from 'copious leucorrhœa,' and who was treated, as I suggested, by means of ice, returned to the Dispensary 'at the end of about a week' after the treatment began, and 'stated that she was cured, *the discharge*, as well as the pain, *having been completely stopped*.' And Dr. Edmunds has informed me that a medical friend of his (whose name I have forgotten) tried the effect of the Lumbar Ice-bag in a chronic case of profuse and peculiarly obstinate leucorrhœa, and that the bag 'acted like a charm,' and quickly effected a cure.

The trophic phenomena which are often associated with neuralgia are also wonderfully controllable by the Dynamic method. In several instances I have subdued the gouty inflammation of joints by ice applied to the appropriate segments of the spine. In several cases under my care of general swelling of the body or of considerable parts of it, associated with evidence of great hyperæmia or actual inflammation of the spinal cord, the swelling has been rapidly and completely subdued by the same treatment. In the report of a case of cerebro-spinal fever treated at Dublin by Mr. Morgan, he says,—"A curious blush was distinct over the lower half of the body, having the appearance of a capillary excitement of the skin, and not of a rash" and that one of the *immediate* effects of the application of the Spinal Ice-bag was "diminution of the blush." A remarkably powerful sedative influence can be exerted by the Spinal Ice-bag on several vital processes in the skin; and when they are accompanied by intense irritation, the remedy is not only surprisingly effective, but so speedily operative as to be peculiarly impressive. The truth of this statement is forcibly illustrated in the treatment of small-pox by the Dynamic method. Unfortunately, my ex-

experience is limited to two cases; but in both the results were equally striking and decisive. The irritation of the skin was subdued as if by magic, and both patients were completely saved from disfigurement. Other examples of the powerful and rapid action of the Spinal Ice-bag on the positive motor nerves presiding over nutrition will be observable in several of the cases to be hereafter given.

Sleeplessness.—The last and not least important of the desiderata needed to constitute the therapeutical armour, by means of which neuralgia and its kindred disorders may be successfully encountered, is the power of imparting sleep to the weary sufferer without poisoning the blood, without even clouding the brain with a noxious influence, without constipating the bowels, and indeed without disturbing any of the orderly functions of the organism. This great and peculiar advantage is possessed by the remedial power in question; and, unlike other narcotic agents, this power is capable of annulling pain without creating in the algic centre a tendency to become, after the sedative influence has ceased to operate, more hyperæmic, and therefore more capable of pain than before.

In order to hasten the recognition, and extend the use of this beneficent influence, I invite attention to the following facts exemplifying its action. Madlle. G., who suffered from sea-sickness whenever she went to sea, crossed from Newhaven to Dieppe 27th May, 1864, and made use of the Spinal Ice-bag during the passage: "during the first two hours she was quite well in all respects; *during the second two hours she was fast asleep—lying on the ice.*" When I was crossing from Newhaven to Dieppe, June 11, 1864, Miss C., a young lady who was lying down very sick, and complaining especially of an acute headache, seeing another passenger relieved by my treatment, asked to have the benefit of it. She was laid on a Spinal Ice-bag, which was placed next the skin. "Her head became quite free from pain in a few minutes; after her head had become well, and she had had the ice on about ten or fifteen minutes, she vomitted once more, and then, *still lying on the ice, fell asleep.* In about half-an-hour she awoke quite well, and continued so." In August, 1865, a lady called upon me to express her thanks for the benefit she and her son and daughter had received from my remedy for sea-sickness, from which she said her children, as well as herself, were great sufferers. "They crossed from Calais to Dover on Sunday, July 30, 1865, and at starting ice was applied along the whole spine of each of them. They lay upon the ice, and *all three were quickly asleep, and continued sleeping till the ice was melted,* when they found themselves within ten minutes' steaming of Dover pier." Mrs. N., "who, when at sea, unless it is as calm as a lake, always

suffers from violent sickness and extreme prostration, often also from cramps and diarrhœa, crossed from Boulogne to Folkstone when the sea was running very high. During the previous day there had been such a strong gale that no steamer ventured out from either of those ports. Immediately she got on board the steamer an Ice-bag was applied along the whole spine. She lay upon the bag during the whole passage, and meanwhile great care was taken to keep her warm." "*She fell asleep about ten minutes after the vessel started, and, notwithstanding the great roughness of the sea, she continued sleeping until woke up by the noise caused by the steam which was let off when the vessel reached the Folkestone pier.*"

Dr. B. Lee, of Philadelphia, has published a remarkable case of a lady who was pregnant and suffered terribly from sea-sickness while returning from Havana. "Violent and distressing retching set in with scarce a moment's intermission. She rapidly became prostrate, the blood leaving the head and extremities, which were very pallid and cold, and, what was still more alarming, severe spasmodic contractions of the muscles of the extremities, with intense pain in the lower part of the abdomen, set in. The ordinary remedies for sea-sickness having been exhausted in vain, her husband now became alarmed, and resolved to apply the ice without further delay. The effects of its application were little short of miraculous. In three minutes the retching ceased, and the spasms were calmed. *In a quarter of an hour she had fallen into a quiet sleep;* and in half-an-hour her hands and feet were of natural warmth, and her face had regained its wonted colour. In two hours she awoke, greatly refreshed, and ate two slices of toast with a cup of tea, and from that time did not miss a single meal." An American lady crossed the Atlantic in 1867 with her daughter, who was then about thirteen years old, and who was peculiarly liable to sea-sickness, from which she suffered severely. Her mother who had had a sound medical education, and who stopped the sickness by applying the Spinal Ice-bag, wrote me an account of the case: from her account I extract these words,—"*The child invariably fell asleep soon after the application, and appeared to rest sweetly,* though retaining the characteristic pallor of sea-sickness to a marked extent." Mr. S. M. Bradley, while acting as surgeon of one of the Cunard steamers running between Liverpool and New York, published in the *Lancet* of Dec. 3, 1864, a letter, in which, referring to the Spinal Ice-bag, he says,—"In the great majority of instances it soothes the nervous irritability which so commonly accompanies sea-sickness, *induces sleep,* and so enables the stomach to receive light food."

I could give several other cases of sea-sickness in which prolonged

and thoroughly healthy sleep was procured by the application of the Spinal Ice-bag; but I will now mention cases of another kind in which its narcotic influence is not less potent. In my pamphlet entitled,—"Cases of Diarrhœa and Cholera, treated successfully through the agency of the nervous system chiefly by means of the Spinal Ice-bag," there are reports of twenty-nine cases of diarrhœa thus treated. In Case I. the diarrhœa recurred at 8 p.m. At 9·30 p.m., having applied the bag to the spine by lying upon it, the patient *fell asleep*, and, excepting a few minutes, slept till 6 o'clock the next morning. In Case IV. *the child fell asleep "in two or three minutes" after the ice was applied*, and slept a full hour; and in this case the like fact was observed on almost every occasion when the ice was re-applied. In Case VI. the patient became sleepy within five minutes after the ice was applied, and *within half-an-hour she was in a sound, refreshing sleep*, as she lay upon it. In Case VIII. the child's mother was greatly astonished by the fact she attested, that *on every occasion* when the Spinal Ice-bag was applied *the child slept on it*. In Case IX. the child "was well-contented with the ice, and each time it was applied, slept on it." In Case X. the man "*dropped asleep at once, slept during the whole time the ice was applied, and a long time afterwards.*" In Case XVII. it is reported that "*the child sleeps much.*" In Case XVIII. "*every time the ice was applied the child went to sleep upon it.*" In Case XXI. the mother of the child says,—"*She generally sleeps on the Spinal Ice-bag each evening.*" In Case XXIV. the patient, who had been awake all night with diarrhœa, *fell asleep in a few minutes after he was placed on the ice, and slept five hours* In Case XXV., *within fifteen minutes after the Spinal Ice-bag was applied*, says Dr. Williams, "*the child was asleep*, whereas it was crying bitterly before the application;" and, again he says—"July 29th, 10 a.m., *after the ice was applied last night, the child fell into a comfortable sleep*, which continued till 7 o'clock this morning."

It will be readily conceded, I think, by professional readers, that if pain can be abolished, if sensibility can be lessened, if the convulsive and spasmodic conditions of muscles can be rectified, if arteries spasmodically closed can be dilated to their normal diameters, if the morbidly excessive action of glands and glandular surfaces can be controlled and regulated, and if the processes of excessive local nutrition can also be counteracted by modifying the temperature of the spinal region, various morbid conditions which are not comprised within the list of complications of neuralgia, but which are often the precursors, and sometimes the causes of that disease, may be remedied by the same

method of treatment. Such, indeed, is the fact, and I now proceed to offer a few remarks on—

The Removal of the Causes of Neuralgia.—When there is reason to suspect that neuralgia is an offshoot of *the gouty diathesis*, the treatment most likely to subdue it, and to counteract its effects will, of course be resorted to, but simultaneously with the adoption of the best hygienic and medicinal measures, the application of ice along the spine will, in many cases, prove an extremely valuable counteractive of the gouty influence. Indeed, in several instances, I have cut short an attack of gout in the extremities by the use of ice alone, applied along the spine; and certainly, when gout directly affects the spinal cord, the use of the Spinal Ice-bag may often put an end at once both to the degenerative action of the disorder on that all-important nervous-centre, and to the neuralgia engendered by it.

When *morbid deposits in the lungs* operate as causes of neuralgia, especially great care needs to be observed in counteracting, by means of ice, their pain-producing influence; but the physician who resorts to this method, and uses such care, may give wonderful relief in these cases. When there is any tendency to inflammation around the deposits—and it would be difficult to say when there is not—it is expedient to use a much narrower bag than is usually applied to adults. The bags made for children—say of ten, twelve, or fourteen inches in length—are of very convenient size for the purpose, as they are narrow in proportion to their length. The distressing night sweats which frequently occur in these cases, may also be controlled, I believe, in almost every instance, by the skilful and appropriate use of the Spinal Ice-bag.

Inequalities in the distribution of the blood in various parts of the body, which often operate as predisposing causes of neuralgia, may be to a large extent corrected by means of the Spinal Ice-bag. One of the most notable forms of this disorder, which consists in habitual coldness of the extremities, especially of the feet, and which is often associated, causatively, with centric hyperæmia, productive of pain—headache especially, may be completely overcome by the systematic use of the "Lumbar Ice-bag," applied along the lower dorsal and upper lumbar vertebræ from 30 to 90, or 120 minutes (according to the peculiarities of the case) two or three times a day. Of course the character and chief seat of the inequality of circulation prevailing in each case must be duly considered, and the part of the spine to which the ice is to be applied, and the length of each application. must be determined accordingly. Whether the inequalities in question arise from congenital weakness of the arterial coats, or from excessive congenital excitability and mobility of the nervous system, or from that peculiar condition established in it by exposure to "malaria,"

great good may be done by the proper use of the Spinal Ice-bag. Of course, in those cases in which the disorder is probably of "malarial" origin, quinine may prove of essential service, but even in such cases the Spinal Ice-bag may succeed after quinine has failed. A soldier, who had been in India, and in the Crimea, and who had had ague several times, suffered from a terrific paroxysmal headache, so terrific, that very frequently it induced violent and protracted delirium. He had been treated during a long period chiefly by means of large doses of quinine, and was finally dismissed the service as incurable. He was unable to undertake any regular employment, and was chiefly supported by his wife's labour. At the request of a clergyman in whose district he lived, I visited him, and treated him with ice, which, acting like a charm, put an end to his sufferings. When I last saw him he was at work every day.

Periodical recurrence of Neuralgic Paroxysms.—At page 170 I have mentioned cases of neuralgia, in which, so far as ascertainable, alternations of temperature did not originate the disease, and did not induce fresh paroxysms, but in which the attacks were especially prone to recur at certain hours each day; and I have adverted to sleep as being in some cases a predisposing cause of the paroxysms, and have explained how it may operate in this way. Why in any such case the paroxysms tend to recur at one period of the twenty-four hours rather than at another must, of course, be thoroughly investigated. If the cause be discovered, it may, perhaps, be removable by making some change in the habits, circumstances, or mode of life of the patient. If no cause can be discovered, or if a cause be discovered but proves irremovable, much may still be done to counteract the special liability to attacks at particular periods of the day by the application of ice to the spine about an hour before the time of the expected attack, on the same principle as that on which quinine in large doses is given in similar cases. When the condition favourable to the onset of a paroxysm seems to be created by sleep, all the insight and sagacity of the physician will be needed to enable him to detect with certainty what is the morbid process during sleep which causes the sleeper to wake with a renovated capacity of suffering, and how that process may be arrested. His chances of success will be proportionate to his knowledge of not only the physiology but the pathology of sleep, a pathology which, indeed, extends over a wide area, and presents manifold aspects and conditions, but which, unhappily, is as yet extremely fragmentary and obscure.

When there is reason to suspect that *dental disorder* of some kind originates the neuralgia, the suspected cause must, of course, be carefully sought for, and, if possible, removed. In those cases

in which, though the algic centre is remote from the root of the fifth, there is reason to think dental irritation nevertheless gives rise to or perpetuates the neuralgia, just as, conversely, the excitement of the nervous system caused by the development of the ovum in the womb, often expresses itself by irritation, pain, and sometimes by destruction of one or more of the teeth, the disorder may, as a rule, be completely stopped at its source by the use of the Spinal Ice-bag properly and regularly applied. How much can thus be achieved in cases of this kind can be imagined only by those who have witnessed the delightful and truly wonderful efficacy of the Spinal Ice-bag in the treatment of various infantile disorders originating in the nervous excitement induced by dentition—laryngismus-stridulus, convulsions, and severe diarrhœa, for example.

In that numerous class of cases in which *functional disorders of the stomach, or of the bowels,* or, more commonly, of both, induce the onset of neuralgic paroxysms, it is, of course, of the utmost importance to ensure the healthy action of these important viscera. The usual routine methods of treating these derangements by means of drugs, are so well known that I need expend no words on this topic beyond the remark, in respect to chronic constipation of the bowels, that when purgative medicines are resorted to, the less they are used the better—consistently with the achievement of the object intended, and that it is far better by means of a very small dose of some suitable aperient each night to ensure the action of the bowels once every day, than, by means of a larger dose on alternate nights or now and then, to cause them to act several times every other day, or at more distant intervals.

It has been quaintly remarked that indigestion is not a disease of the stomach : with equal reason it may be said that constipation is not a disease of the bowels ; and, indeed, these paradoxes embody a great and important truth. A thorough knowledge of the physiology of vomiting* assures us that that process is wholly dependent on nervous action ; and by a large number of experiments I have completely established the doctrine that the only scientific, and incomparably the most successful, method of treating sea-sickness, the sickness of pregnancy, and, indeed, all kinds of symptomatic vomiting is through the agency of the nervous system by means of the Spinal Ice-bag. In respect to sea-sickness, this statement is amply proved by the numerous reports of cases given in my book on that disease. I possess, as yet unpublished, records of several cases of the sickness of pregnancy treated with unprecedented success in the same way. Numerous cases of vomiting symptomatic of other disorders which has been quickly

* See the chapter on this subject in my work on "Sea-sickness."

arrested by similar treatment, have been published by me from time to time in the medical journals; and I observe in the *Medical Times and Gazette* of Feb. 17, 1872, that the reviewer of my pamphlet, "Cases of Diarrhœa and Cholera," remarks: "In fairness to Dr. Chapman we ought to say that we have found the Ice-bag strikingly successful in maniacal conditions, when applied to the cervical region; *in symptomatic vomiting likewise;* and in some other conditions too numerous now to mention." Now, if a power so great as here described can be excited over the stomach by acting on the nervous system, there is an *à priori* probability that in the same way a beneficial, and not less efficacious, influence may be exerted over other functional disorders of that viscus; and having a large experience of the effects of this method of treating the various gastric disorders, I can affirm that the success attending its adoption is fully equal to that which has been experienced from the treatment of sea-sickness by means of ice; so that, in fact, in those cases in which functional disorders of the stomach operate as exciting causes of neuralgia, those causes and the disease itself may be most effectually counteracted by one and the same treatment. And this remark is also applicable to both diarrhœa and constipation. The proverb—"Extremes meet," is an expression of universal experience, and with reference to functional disorders of the bowels it is especially and even astonishingly true. This is not the place in which to explain how it comes to pass that a morbidly excessive amount of nervous force distributed to the arteries, mucous membrane, and muscular coat of the bowels during different periods of time in different cases, will produce in one case diarrhœa, and in another constipation. I must now content myself with affirming that such is the fact, that it is capable of a thoroughly scientific explanation, and that when the mode of action of the nervous centres on the bowels is rightly understood, it is difficult to conceive how the phenomena in question could be otherwise than what they are. If these statements are true, and I am sure they are, the reader will perceive that not only gastric disorders, but enteric disorders also may be corrected by acting on them through the agency of the nervous system.

When *hæmorrhoids* prove causative of neuralgia they must, of course, be reduced as completely as possible. In addition to the remedies commonly resorted to, I will mention two which I have often found very useful: one consists in the *frequent* insertion of finger-shaped pieces of ice into the rectum—the pieces having first had their sharp angles melted off by being held in the hand a short time; the other consists in the application of an eight-inch Spinal Water-bag, containing water at 112° F., along the lumbar and lower dorsal vertebræ. But in cases in which any part of the lower half of the body is affected with

neuralgia the use of heat, as just suggested, is contra-indicated.

In the large proportion of cases in which *menstrual disorders* appear to be either productive of neuralgia or preventive of its cure, they may be treated with surprising success by suitably modifying the temperature of the spinal region. In fact, while it is admitted, I believe, that those disorders which are designated collectively functional diseases of the female reproductive organs, are signally rebellious to treatment by means of drugs, precisely those are amenable in an especial manner to the Dynamic method; and I suppose there is no other group of human maladies in which the marvellously great curative power of that method is so conspicuously displayed as it is in this. I regret that my monograph, entitled "The Functional Diseases of Women," is out of print; otherwise, I would refer my readers to that book for explanations and evidence of the truth of the above statement; but what I have said in the section on the pathology of uterine neuralgia in the present volume, together with the reports of cases given at the end of it, will amply substantiate that statement. The efficacy of the Spinal Ice-bag as a remedy for those disorders of the nervous system which commonly occur during the period when the menstrual function ceases, and which often give rise to neuralgia, can scarcely be over-stated.

When neuralgia is associated with *pregnancy*, and seems to be a consequence of it, as it is not infrequently, the tumultuous excitement of the nervous system which pregnancy induces, and which is the common source of the several special disorders experienced during that condition—sickness, faintness, and fainting fits, for example—must be subdued. This can be thoroughly done by means of the Spinal Ice-bag, which, however, can only be rightly and safely used in such cases by those medical practitioners who have thoroughly acquainted themselves with its mode of action, and its widely different effects when applied to different parts of the spine. Ignorantly or recklessly used, it is at all times liable to be attended with danger; but just as chloroform, which is the greatest conceivable blessing to a parturient woman, may be administered so stupidly as to lull her into a fatal sleep, so the Spinal Ice-bag, which sooner or later will become generally recognised as the especial friend of every pregnant woman who suffers during her period of gestation, may be so heedlessly applied by those who know nothing of its power and influence over the womb as to prove fatal to the ovum by producing abortion. But used as it can and ought to be used in the cases now in question, its effects are perfectly delightful. Among the cases hereafter given there is one of neuralgia of all four limbs, associated with other disorders consequent on

gestation; and such was the signal relief and comfort obtained by the sufferer from the use of the Spinal Ice-bag that she clung to it until the last day of her pregnancy, as if it were an indispensable necessity, which, indeed, according to her feelings, it really was.

In those cases in which the exciting cause of neuralgia can be traced to *displacement of the womb*, it must, if possible, be made to resume its normal position; for, until it does, the pain is scarcely likely to be permanently arrested. I need not discuss here the several varieties of displacement, the different degrees of each, and the relative values of the numerous remedial expedients usually resorted to in the different cases. There are two observations, however, which I must now permit myself to make on this important subject: the *first* is, that in cases in which the circumstances, as well as the physical and psychical conditions of the patient are favourable, the disorders in question are remediable by the spontaneous efforts of Nature herself to an extent far greater than is generally supposed; the *second* is, that in a certain proportion of cases, how considerable I am unable to say, a cure may be effected without the aid of any kind of pessary, and without any manipulation whatever of the womb itself, by the simple expedient of using the Spinal Ice-bag in a suitable manner. Each of these observations is the result of both neuro-physiological considerations and experience conjoined. At pages 124-5 I have explained what constitutes, in many cases, at all events, the immediate cause of prolapsus uteri, and I am enabled to affirm that in certain cases of retroversion and retroflexion, the displacement is due to a like proximate cause; and hence it is that, by increasing the circulation of blood in the pelvic viscera, a remedial influence is exerted over these troublesome affections. Moreover, I venture to affirm that in many cases the womb droops because the nervous system of the patient is in a morbid condition, induced by a drooping spirit depressed by external circumstances or emotional influences, and that if a beneficial psychical revolution could be effected in such cases the womb would raise itself again into its healthy position.

On the very day after the preceding paragraph was written I received a letter from a medical man, practising in Nottingham, respecting two cases of uterine displacement, which he had begun to treat by the Dynamic method, and the reports of which, so far as his experience of it had already gone, tend to confirm the view just expressed, as well as to prove the efficacy of that method. He writes,—"One of the cases is that of a woman who has *anteversio uteri*. She came under my care four months ago, having been previously, for two years, under the care of two or three doctors, who told her it was 'weakness.' Her sufferings at

the monthly periods were *great;* she had none during the intervals. I prescribed the Spinal Ice-bag, which she used once daily for two months. During the four succeeding periods she had scarcely any suffering (on one occasion only she had pain during one day); and the sickness, which had previously been fearful, was not experienced at all." Only at the end of the four months which she had passed after ceasing to use the ice did her "terrible sufferings" return. "I have now advised her," he writes, "to use the bag regularly for several months, in the hope that the mal-position may be effectually remedied. I am perfectly satisfied as to the diagnosis which I confirmed by the use of the sound." He adds,—"I have another case of a girl of nineteen of a similar condition of womb. Sickness fearful—*nothing* would remain on her stomach, not even a small dose of a mixture containing bismuth and hydrocyanic acid, &c., so that I felt that if I could not prescribe the Spinal Ice-bag I could do nothing." He did prescribe it, and says,—"Within twenty-four hours, both food and medicine were retained, and I hope by persevering in the use of the bag the state of the uterus will eventually be rectified." It is by no means certain that in these two cases any improvement in the position of the womb was effected, for no positive evidence of such improvement is contained in my correspondent's letter; and violent and prolonged vomiting, as well as intense pain, symptomatic of various diseases, may be subdued by the Spinal Ice-bag, although their cause may continue to exist. Nevertheless, inasmuch as I know by experience that the position of the womb can be changed by the action of the Spinal Ice-bag, I am disposed to think that in the cases in question the womb may have been moved in the direction of its normal position.

In those cases in which the sensory nervous centres are quickly excited into that state productive of neuralgia by *excessive sexual indulgence*, by *masturbation*, by various *muscular movements*, and by *alcoholic drinks*, the patients will, of course, if they possess an average amount of common sense, learn prudence from experience, and will thus prevent the operation of these exciting causes of the disease. I am satisfied, however, that morbid excitement of the sexual instinct, which sometimes arises chiefly out of physical conditions over which the mind has little or no control, may be allayed to a remarkable extent by means of the Spinal Ice-bag; and, *mutatis mutandis*, this observation is also strictly applicable to the ungovernable desire for alcoholic fluids. I know too, by experience in the treatment of cases, that persons who induce neuralgia by ordinary muscular movements—by playing on the piano, for example—may be enabled by the same method of treatment to continue those movements without inducing pain.

Concussion and shock, great cold or heat, and the electric disturbances of the atmosphere, which have been shown to operate occasionally as exciting causes of neuralgia, may, in so far as their effects on the nervous system are concerned, be counteracted in a striking degree by modifying the temperature of the spinal region—chiefly by the use of ice ; and thus, in so far as neuralgia is induced by these agencies, its development may be prevented.

When *mental exertion* of any kind is found to bring on neuralgic attacks, the patient's experience will, of course, aid the medical adviser in admonishing him to give himself up to mental rest and recreation until, by proper treatment, the neuralgic tendency has been eradicated. And as *psychical influences* often play an important part both in producing and in perpetuating neuralgia, the physician ought, in fact, to be prepared to

"minister to a mind diseased,"

as well as to the bodily ailment ; but, indeed, the combination of qualifications necessary for the due accomplishment of this task is rarely possessed, and he who is most gifted with it feels his insufficiency most strongly. Still, much may be done by any medical man possessing the average amount of insight, judgment, and sympathy, and who is really interested in his patient—much more, indeed, than is generally supposed possible, and very much more than was really possible until the date of my discovery that the amount of blood in the brain can certainly be increased or lessened by appropriately modifying the temperature of the spinal region.

When neuralgia can be traced to *pressure or irritation of the affected nerve,* or of any nerve producing pain by reflex action, the cause must, of course, be removed if practicable ; but, unfortunately, such removal is in the majority of cases impracticable : an aneurism, a diseased bone, or a cancerous tumour may produce excruciating neuralgia, which, nevertheless, the most skilful surgeon, having regard to the general welfare of the patient, may deem it inexpedient to attempt to relieve by any operative measure. In all such cases our efforts must necessarily be directed to annul or relieve the pain itself, as regardless of its cause as if it were, in fact, an "immaterial,"* "true,"† or "centripetal"‡ neuralgia.

There are few morbid influences which are more capable of producing severe and protracted neuralgia, and which, at the same time, are more susceptible of removal or dispersion than are *syphilitic deposits.* The literature of syphilis contains records of many remarkable cases of intensely severe and paroxysmal neuralgia of long duration, in which the patients have been completely

* Handfield Jones. † Anstie. ‡ Eulenberg.

relieved of their sufferings by the judicious use of iodide of potassium. In every case, therefore, in which there is the least ground of suspicion of a syphilitic taint, this invaluable medicine should be systematically used, and in some cases it may be expedient to adopt other anti-syphilitic treatment, until the neuralgia is subdued, or until no justifiable hope can any longer be entertained of subduing it by thus attacking its supposed cause.

Dynamic Counteraction of Pain itself.—But after the utmost possible effort has been made to discover and remove or neutralise all locally exciting and all constitutional causes of neuralgia, it remains, in the great majority of cases, entrenched in some one of the citadels of the organism, and can only be treated at once rationally and successfully by direct action on the different nervous centres in which in different cases it happens to be located. And this, as I hope I have proved, can only be effectually accomplished by *lessening the afflux of blood in the nervous centres which are directly related to the painful nerve*. This object can, I affirm, be achieved in the great majority of cases, by modifying the temperature of some part or parts of the spinal region. In so far, therefore, as my method of treating neuralgia is supplementary to, or differs from, the methods practised, it reposes on two propositions—*first*, that the pathology of neuralgia which I have sketched is true; and, *second*, that the circulation of the blood in the nervous centres along the back, including the spinal cord and the sympathetic ganglia, can be increased or lessened by the application of heat in the one case and of cold in the other along the spinal region. If these propositions are true, the method of treatment here proposed has a scientific basis; if they are not, it simply falls back into the region of empiricism. They and the method in question are logically related and coherent, and if the propositions themselves can be proved untenable, I shall readily abandon all claim to a scientific character for the treatment founded upon them. I feel not less sure, however, of my own existence than I do of their truth, and of the efficacy of the method of treating neuralgia directly developed from them; and I hope that an examination of the facts described in the narratives of the cases hereafter given will enforce attention from medical men, will induce them to consider, apart from the influence of preconceived opinions, what is the character of the evidence here adduced in support of the pathology in question, what is the cogency of the reasoning by which that evidence is shown to conduce to the conclusion arrived at, and what are the facts which I have reported elsewhere justifying the assertion that the circulation of the blood in the nervous centres can be modified by the applica-

tion of cold and heat along the spine. If, as I am fully persuaded will be the case, such an unprejudiced examination should result in convincing inquirers of the truth of the doctrines in question, they will find that between that conviction and the method of treating neuralgia here proposed there is but a step, and one which they will not hesitate to take.

Neuralgia may be due to some cause not discovered; it may be due to some cause which, though discovered, is not removable; or it may be due to some cause both discoverable and removable, but may nevertheless persist, and give no sign of subsiding after its cause has been removed. In each of these cases it becomes the duty of the physician to concentrate all his efforts on the abolition of the pain itself. In order to effect its abolition by the application of heat or cold to the spine, it is necessary to determine both in what part of the "true spinal cord" the proximate cause of the pain is seated, and, if possible, whether that part is primarily or secondarily affected.

All those cases in which the algic centre is within any part of the vertebral canal, and which are cases of neuralgia pure and simple, I treat by means of ice, applied in a Spinal Ice-bag immediately over that centre, and as far above and below it as may seem expedient after the general condition of the patient has been duly considered.

If the algic centre be within the skull, that is to say, if it be in the medulla oblongata—the pain being referred to one or several branches of the trigeminus—I adopt other measures; for obviously it is impossible to apply cold directly over the medulla oblongata. When specially adverting to the treatment of trigeminal neuralgia, I shall explain the therapeutical value and the mode of application of heat as an anti-neuralgic agent.

To procure sleep so urgently needed in neuralgic cases it will often suffice to apply the Lumbar Ice-bag along the lower part of the spine when the patient goes to bed; but if necessary, the eight-inch Spinal Water bag, containing water at 115° F., may be applied to the cilio-spinal region simultaneously; and there are few cases in which the one or the other, or both together, will not avail to establish that degree of cerebral anæmia which is the prelude and indispensable condition of normal sleep.

The nervous centre related to the nerve in which neuralgia is felt may be secondarily and not primarily affected; and though the malady may be annulled by the sedative influence of cold on that centre, the treatment which consists in applying that influence over the central region within which the morbid excitement is first operative, is most rational, and likely to be most effective. If, for example, facial neuralgia should originate in some irremoveable source of irritation seated within the abdominal or the pelvic

cavity, the irritating impressions will probably impinge on some part of the lower half of the spinal cord, will then, by reflex action of the nerve-cells which receive them, be shot up the cord to the roots of the fifth nerve, producing there a morbid nutrition, the proximate cause of the pain which is referred to some one or more of the terminal branches of that nerve. Now it is obvious that in such a case the chances of a permanent cure would be greatest were the morbid impressions counteracted at the point where they first impinge. If the remedial influence were exerted only at the point of their secondary incidence, and the pain were subdued, the malady would merely be kept in check so far as concerns the fifth and other nerves emerging from the topmost part of the spinal axis, and the irritation might easily be reflected along other tracts, thus causing neuralgia in some other part of the body. This principle should especially be borne in mind by the physician when he proceeds to treat, by means of the Spine-bag, cases of neuralgia associated with pregnancy, with disease of the womb, or with any displacement of that organ. Of course the neuralgia may co-exist with any of these states without any causative relation to them. The formation of a correct judgment on this point will be aided by exact knowledge of the condition of the several segments of the spinal cord in respect to the amount of tenderness evinced when pressure is made on each in succession. When the focus of the neuralgia has existed at one spot for a considerable time, there is almost sure to be spinal tenderness at the points corresponding to the central end of the affected nerve ; and if, at the same time, there be tenderness at the points corresponding to the central ends of the nerves ramifying in the organs in which irritating impressions productive of the neuralgia may, there is reason to think, originate, the probability that they actually do so will be great. Indeed, even in cases in which no such tenderness is discoverable, the results of treatment often justify the application of the principle here indicated ; for, having regard to all the conditions of the patient, I have frequently been led to infer the existence of the cause of the malady at a point remote from that of its manifestation, have treated it accordingly, and generally with success. Cases of this kind, especially of facial neuralgia associated with oppressive headache, and which are capable of being completely cured by the proper application of the Spinal Ice-bag, may be frequently met with in women, especially at the period when the catamenia finally cease. In these cases, however, the curative influence is exerted not merely in lessening the afflux of blood in, and the reflex action of, those segments of the spinal cord operated upon, but also in increasing the circulation of the blood throughout the lower half of the body by the vaso-motor agency of the sympathetic ganglia influenced by the ice.

If, in order to treat neuralgia by means of the Spinal Ice-bag it were only necessary to determine where is the central seat of the malady, or where is the central point at which the exciting cause first operates, and then to apply the sedative power of cold at one or both of these points, the practice of the therapeutical principle here advocated would be beautifully simple; but, in fact, the conditions of the living organism are so complex, they differ so remarkably in different persons and in the same person at different times, that heat or cold applied along the spine, like medicines taken internally, produce effects in one person widely different from those they may produce in another, and in like manner the effects produced in the same person will differ greatly at different times. In healthy persons the "tolerance" of ice along the spine is very different in different cases, but in diseased persons this difference is much greater, and is mainly due to the fact that the circulation of the blood in them—or, in other words, the movements of the arteries—owing to disturbances in the nervous system, is already irregular, especially at the seats of the disease; and whereas ice applied along the spine of a healthy person during some hours may produce no appreciable effects, if it be applied along the spine of a diseased person even for a short time, the diseased structures might experience such a sudden and copious afflux of blood as seriously to augment their morbid condition. Hence it happens that in cases of neuralgia complicated with other diseases, or with tendencies to other diseases, the simple principles of treatment indicated above cannot be applied without many and various qualifications. It may be desirable in treating trigeminal neuralgia, to apply heat over the cilio-spinal region; but if there be a predisposition in the patient to suffer from neuralgia in different parts, the use of heat as indicated may induce severe brachial or thoracic neuralgia. If a person were suffering from brachial neuralgia, and at the same time were peculiarly liable to hyperæmic headache, it is probable that this would be increased by the treatment which should be adopted for this form of neuralgia when unassociated with any such tendency. Again, in a case of intercostal neuralgia associated with tubercle in the lungs, or with a tendency to pulmonary hæmorrhage, the treatment which could otherwise be adopted with perfect safety might be painful, and would certainly be dangerous; in the one case inflammation around the tubercular deposit might be lighted up, or if pre-existing might be increased; in the other the area within which hæmorrhage has previously occurred might be so flooded with blood that another attack of so-called pulmonary apoplexy would ensue. Moreover, epistaxis, pulmonary hæmorrhage, hæmorrhoids, excessive menstruation, abortion, and even miscarriage in advanced periods of pregnancy

may be caused by the injudicious use of the Spinal Ice-bag. But while these possibilities should enjoin the exercise of caution and forethought when making use of the therapeutic power in question, they constitute at the same time a high eulogium of it, for they imply that in the hands of those duly qualified to use it, it is capable of becoming an agent of wide-spread beneficence. The solution of the problem how to secure all the good and to avoid all the evil which may arise from the use of heat and cold applied to the spine, is far more difficult than it may at first sight appear. It necessitates a thorough knowledge of each of the chief elements of the subject, experience in using that knowledge, circumspection, reflexion, and the practice of a sort of strategic skill in the achievement of objects by indirect or circuitous paths, when attempts to accomplish the same purposes directly would probably be attended with failure, and even with danger. Difficulties of the kind just adduced are precisely those which tax the insight, judgment, and ingenuity of the physician, and in proportion as he overcomes them does he distinguish himself from those whose lives are spent in what is called, or mis-called, a "safe routine practice." Gentlemen who on *à priori* grounds deny the possibility of producing untoward results of the kind just indicated by the application of the Spinal Ice-bag will consult at once their own reputation and the welfare of their patients by refusing to permit themselves to be so far misled by their seemingly scientific, but really prejudiced, scepticism as recklessly to apply ice along the spine in cases of the kind just mentioned, confident that at any rate, "it can do no harm, even if it does no good." In concluding these general remarks I must state emphatically that before any one can be duly qualified to treat neuralgia, or, indeed, any other disease, by means of Spine-bags, he must thoroughly acquaint himself with those general principles of neuro-physiology and pathology on which the practice reposes, and must think out for himself what is the best way in which its doctrines may be applied in different cases, especially in those in which the disease he is called upon to treat is associated with other morbid conditions.

Dynamic Treatment of the Various Complications of Neuralgia.—These have been shown to grow out of morbid conditions of the nervous centres analogous to those out of which the disease itself is developed; and the general principles and methods of treating it are equally applicable in the treatment of its kindred disorders.

The cramps, or tonic spasms, twitches, jerks, and other convulsive movements forming group 3, described in Chapter III., are now well known to be the most effectually controllable by those drugs which exercise a *sedative* influence on the nervous system,

and among them bromide of potassium is recognised as chief. This salt may be used with especial advantages in those cases in which this group of complications forms a prominent feature of the malady; but it is far better to subdue these symptoms by the sedative influence of ice applied immediately over those nerve-centres from which the motor nerves producing the morbid muscular movements in question emerge. It is far better, because, while the constitutionally depressing effects of the drug are avoided, the requisite sedative influence may by means of ice be mainly concentrated on the focus of disorder; and because, as a general rule, that influence, thus concentrated, is more effective than when by means of bromide of potassium it is extended over the whole nervous system.

The complications due to vaso-motor agency are of two kinds: those resulting from an excess of vaso-motor energy, and those resulting from vaso-motor paresis. The former, which are very common, need to be treated by means of cold; the latter, which are comparatively rare, must be treated by means of heat—the application in each case being made over the nervous centres morbidly affected.

The complications, consisting of excessive actions of glands, need to be treated differently in different cases: when the lachrymal, or the salivary glands are unduly active, or when the nasal mucous membrane is so, they may be controlled by the application of heat to the cilio-spinal region. Heat thus applied exerts a two-fold beneficial influence: it lessens the supply of blood to the secreting structures, and at the same time lessens the supply to the roots of the positive motor nerves, from which those structures are deriving their excessive functional energy. But the nasal mucous membrane and the salivary glands, which, there are reasons for believing, are innervated by the portio dura, may also be beneficially influenced by the application of ice across the occiput and topmost cervical vertebræ, and, as a general rule, it is best in all cases of neuralgia, when the nature of the cases allows the physician to choose whether he will accomplish the object in view by means of either heat or cold, to employ cold. All cases of bronchorrhœa, diarrhœa, leucorrhœa, spermatorrhœa, and excessive action of the kidneys must be treated by means of ice applied over the nervous centres functionally related to the morbidly affected parts: heat thus applied would augment the disorder.

The treatment of the trophic complications must be essentially the same as that of the secretory disorders indicated in the preceding paragraph.

Special Neuro-dynamic Treatment of Certain Kinds of Neuralgia.—I have already dwelt so fully on the principles and

method of treatment of neuralgia in general, as well as of its complications, that it is unnecessary that I should advert in detail to the different modifications of that treatment, which may be needful in order specially to adapt it to every one of the several kinds of the disorder. A few of them, however, do require to be treated either in a peculiar manner or, at least, with peculiar care; and, therefore, concerning the treatment of these, I ask attention to the following observations.

Facial Neuralgia.—When pain is felt in any branch of the trigeminal nerve, the algic centre is, of course, in the medulla oblongata; or, in other words, it is within the skull, and obviously it is impossible to apply cold directly over the medulla oblongata. It is therefore necessary to resort to other means. In the first place, ice may be applied across the occiput and *uppermost* cervical vertebræ, and in slight or recent cases the cold thus applied not infrequently effects a cure, or affords considerable relief. By this simple expedient toothache is often completely arrested. If the cold thus necessarily applied at a considerable distance from the medulla oblongata fails to influence it sufficiently to abolish the pain, the object in view may probably be achieved by indirect action or derivation—still through the agency of cold. Again, I do this by applying ice, in the Lumbar Ice-bag, over the lower third of the spinal cord. Applied in this manner, ice exerts a sedative influence over the vaso-motor nerve centres of the lower part of the body, and by thus facilitating the dilatation of the arteries of the pelvic viscera and lower extremities, derives blood from the encephalon, and therefore from the medulla oblongata. Even severe cases of trigeminal neuralgia may be cured in this way, and in proof that the amount of blood in the brain can thus be greatly diminished, I may observe that it is truly wonderful how rapidly and completely plethoric headaches, even of long duration, may be cured by the Spinal Ice-bag. In many cases, however, it is expedient to apply ice across the occiput and over the lower third of the spinal cord simultaneously: though these applications are widely separated from each other, they co-operate to effect one and the same result, which may sometimes be achieved by the two conjointly when alone would fail.

A third plan of acting on the medulla oblongata is by the agency of the vaso-motor centres functionally related to the arteries conveying blood to the brain; and in those cases in which there is evidence of enfeeblement of those centres this plan is especially indicated, and is remarkably successful. It consists in the application of heat over the cilio-spinal region. In order to act as little as possible on the spinal cord, and as much as possible on the ganglia of the sympathetic, I apply a

column of heat on each side of the spine, and not immediately over it. An eight-inch Spinal Water-bag is best for the purpose. The temperature of the water put into the bag should be not lower than 110°, and *rarely higher* than 120° F. *The lower the temperature used consistently with producing the effect intended the better.* 115° is a good average temperature. The bag should be so applied that the middle of it is over the point of junction of the cervical with the dorsal vertebræ, and great care should be taken that it does not slip upwards while it is on, and thus allow the heat to come near the occiput. The bag should remain on till the water in it becomes cool, and should be re-applied several times a day. The amount of blood in the head may thus be notably reduced—in some persons to such a degree as to cause faintness, and in some cases of trigeminal neuralgia this treatment suffices to cure the disease. But a combination of two out of the three plans now described, or of all three together, in severe or chronic cases may be advantageously adopted, and each and all will be greatly aided by the systematic and prolonged use of the warm bath.

The use of heat as described is, as a general rule, contra-indicated in cases in which there is a tendency to brachial neuralgia and in cases of extensive painful excitability of the spinal cord. The heat is likely to augment both these maladies.

Brachial Neuralgia occasionally presents difficulties, owing to the fact that in some cases, while the ice is annulling the brachial pain its sedative influence on the sympathetic ganglia controlling the brain arteries increases the cerebral circulation unduly, and thus produces headache, and, in the predisposed, even facial neuralgia. In such cases the 'strategic skill' of the physician must, as I have said, be exercised, and amongst other plans that of applying ice across the occiput and along the cervical vertebræ *simultaneously* may often be adopted with great advantage.

Intercostal Neuralgia and Back-ache.—Persons suffering from these affections, but who are otherwise healthy, may be treated easily and successfully by means of the Spinal Ice-bag. When, however, these forms of neuralgia are associated with the presence of any kind of pulmonary disorder, the practitioner must exercise great circumspection and care in prescribing the application of ice along the dorsal region. In asthmatic cases the ice will generally prove remarkably beneficial, lessening the asthmatic irritability and curing the neuralgia at the same time. Bronchial catarrh in its first stage and bronchitis are increased by the use of the Spinal Ice-bag; but when all inflammatory symptoms have subsided, and the patient is merely beginning to suffer from an excessive secretion of mucus, ice along the dorsal region may be used with safety, and while curative of the neuralgia, will lessen, or even com-

pletely arrest, that secretion. In cases of hæmoptysis, or in those in which there is a tendency to pulmonary hæmorrhage, ice along the dorsal spine is dangerous, and ought only to be used with great watchfulness. In cases in which there are morbid deposits in the lungs, ice must also be used with peculiar care. In all cases in which there is pulmonary disorder of a kind causing the use of ice along the dorsal spine to be attended with some slight risk, it is expedient to make use of a narrow bag—the 10 or 12-inch Ice-bag (designed for children) being applied between the scapulæ of an adult.

Ilio-hypogastric, *gluteal*, *pudic*, *crural*, *and sciatic* neuralgia, unaccompanied with hæmorrhoids and occurring in persons of the male sex, may generally be treated successfully and without any difficulty by means of the Spinal Ice-bag; but if hæmorrhoids are present, much caution, judgment, and tact must be exercised by the practitioner when prescribing this remedy. And when treating women by means of it, it is indispensably necessary that these faculties should be pre-eminently active: the condition of the womb must always be duly considered, and the possible effects of cold applied along the lower dorsal and along the lumbar segments of the spinal cord must be fully anticipated and taken into account before the use of the Spinal Ice-bag is recommended.

The treatment of visceral neuralgias is, of course, according to the principles advocated in this volume, substantially the same as that of superficial neuralgias; but those principles need to be applied occasionally in a somewhat different way. For example, most of the thoracic conditions mentioned at pages 72-3 need to be treated mainly with reference to the vaso-motor centres only.

Chest-ache.—The affections which I have denoted by this phrase consist chiefly of local congestions, which may often be quickly subdued by the application between the scapulæ of the double-columned water-bag, the temperature of the water being at about 115° F. But the practice of the Neuro-dynamic method can only be rightly and, in many cases, only safely conducted by those who imbue themselves with a thorough knowledge of the neuro-physiological and neuro-pathological principles on which that practice is founded. By the light of that knowledge the medical attendant will be enabled to form an approximatively correct idea of the immediate cause of the pain, and accordingly to act, at least, safely if not successfully. If examining the special condition of the chest walls and of the lungs, along with the general condition of the patient, we find decisive evidences of thoracic congestion, it is probable that in such cases the congestion is the exciting cause of the pain complained of; and the inference is legitimate that the collateral sympathetic ganglia of the dorsal segments of the spinal cord are in a state of paresis, and that the

use of heat in the manner described is indicated; and this inference may appear to be decisively confirmed by the occurrence of hæmoptysis or more abundant pulmonary hæmorrhage. In such cases it is likely that the heat will relieve both the congestion and the pain at the same time. It may be, however, that though the cause of the pain is of a congestive character, the pulmonary congestion may be the counterpart and, indeed, more or less, the product of anæmia in some other part of the body. If the patient be a woman, this is especially likely to be the case: there may be deficient or arrested menstruation and insufficient circulation in, denoted by habitual coldness of, the lower extremities, and when these conditions obtain they must be removed by the appropriate use of ice. Their removal will be followed in a large proportion of cases by that of the pulmonary congestion and chest-ache in question. If the symptoms do not seem to indicate the adoption of either of these measures, evidences of anæmia of the chest walls may, perhaps, be observable; and in such cases the existence of hyperæmia of the corresponding vaso-motor and neighbouring spinal centres is inferrible, and the inference points to the use of ice along the dorsal spine as likely to annul the pain in question.

Angina pectoris, according to the pathology of it expressed at p. 78 *et seq.*, is essentially a spasmodic disorder. The Neuro-dynamic treatment of it must, therefore, in all cases involve a lowering of the temperature of the thoracic segments of both the spinal cord and its collateral sympathetic ganglia. I have shown that the disorder is probably sometimes predominant in the cord, sometimes in the ganglia, although both are generally affected, but in relatively different degrees of intensity. Now, if the disease is not complicated by the co-existence of any other malady, a full-sized Ice-bag—*i.e.*, one 20 or 22 inches long for a woman, and 24 or 26 inches long for a man—may be used most advantageously; but if there are complications, it should be borne in mind that while having reference to them the practitioner may judge it expedient to restrict the ice to certain segments of the spine, the bag should be of maximum width in those cases in which the sympathetic ganglia are chiefly involved, whereas in those cases in which the disorder is mainly in the spinal cord, the *narrow* 10-inch bag will suffice to exert a curative influence. This fact is important, because in some cases the state of the lungs may contraindicate the use of a bag of ordinary width for an adult.

Of the several forms of pain experienced in the abdominal and pelvic viscera and denominated respectively *gastralgia*, *enteralgia*, *hepatalgia*, *nephralgia*, and *neuralgia* of the *bladder*, of the *urethra*, of the *ovaries*, and of the *testicles*, I need only remark

that as they all belong, like *angina pectoris*, to the order of spasmodic diseases, their Dynamic treatment is essentially the same, and consists in the application of ice, the various qualifications and precautions already often adverted to being duly observed.

Uterine neuralgia, comprising "irritable uterus," dysmenorrhœa, and several other kindred disorders, is so generally prevalent, and involves such a vast amount of all but helpless suffering, that I think it expedient that I should give a somewhat detailed description of my method of treating this really formidable disease. According to the general confession of the Profession, uterine neuralgia and its complications form part of that large group of maladies, the treatment of which has always been extremely unsatisfactory. Its chief aim, of course, has been to overcome the chief evil—pain, and secondarily, it has been directed to effect the removal of uterine congestion or inflammation, to facilitate the menstrual process, and to improve the general health. The pain is usually combated by narcotics, by nauseating remedies, by warm baths, and by the application of sedatives both to the hypogastric region and *per vaginam*. In those cases in which congestive or inflammatory symptoms are present local depletion is urgently recommended, and in some cases even general bleeding is also advised. Improvement of the general health is sought to be effected by tonics, exercise, a bracing climate, and an abundance of fresh air. The success achieved by these practices is, as a general rule, so deplorably slight that uterine neuralgia and its kindred maladies have long held a conspicuous place among the *opprobria medicorum;* and, indeed, this can be no matter of surprise if the pathology of these affections as sketched above be true, for obviously the therapeutical desideratum is a power of lessening the energy of the nervous centres implicated, and none of the medicines referred to above possess that power except when so used as seriously to impair the general health, and, indeed, to prove dangerous to life itself. That therapeutical desideratum is, however, according to my experience, completely fulfilled by the Spinal Ice-bag, *suitably applied* from 30 to 90 or even 120 minutes two or three times a day. I say "suitably applied" because its tolerance, its harmlessness, and its efficacy depend on the fulfilment of this condition. If the patient does not suffer from headache, and if her lungs are quite healthy, the Ice-bag may be advantageously applied along the spine from the middle of the cervical region down to the third or fourth vertebra, *but not lower*. Headache, with cerebral hyperæmia as its proximate cause, is, however, a frequent concomitant of uterine neuralgia, and in such cases cold ought not to be applied along the upper part of the spine, but

should extend only along the six or eight lower dorsal, and the three or four upper lumbar, vertebræ. In these cases I generally use the upper two cells of a 20-inch Spinal Ice-bag applied along the part just described, the lowest cell remaining empty, and either doubled behind the middle cell or dependent over the sacrum. I adopt this plan in order securely to restrict the ice to that part of the spine intended to be acted upon: if ice were put in the two lower cells of the Spinal Ice-bag, the upper one being left empty, and if, after the two lower cells were applied along the lower part of the spine, the patient were to lie down on the bag, the melting ice would flow back towards its mouth, and thus, contrary to my intention, the cold would come in contact with the upper part of the spine, and by lessening the energy of the collateral ganglia of the sympathetic, would facilitate the dilatation of the arteries supplying blood to the brain, and this dilatation would increase the cerebral hyperæmia supposed to be already present, together with the headache dependent upon it; whereas, if by means of the upper two cells of the bag the ice be restricted as described along the lower part of the spine, the afflux of blood to the lower half of the body will be increased by vaso-motor agency. Blood will therefore be derived from the brain, and the headache, thus relieved by removal of its proximate cause, will quickly cease.

Pulmonary disorders of any kind, when complicating the principal malady, necessitate the exercise of especial caution in prescribing the use of the Spinal Ice-bag; in all cases thus complicated, the medical attendant should avoid its application between the scapulæ, unless he scrupulously observes the precautions indicated above. In the treatment of these cases I use a bag which I expressly devised for the purpose of exerting a special influence on the pelvic organs, and which I call the "Lumbar Ice-bag." It is about ten inches long, and consists of two cells. When the associated pulmonary disorder does not affect the lower lobes of the lungs both cells of this bag may generally be used in order to combat the uterine disease, and generally with an indirectly, but greatly beneficial, influence on the pulmonary affection. The bottom of the lowest cell of the bag should be on a level with the third or fourth lumbar vertebra, *not lower;* the bag will thus reach upwards to the lower angles of the scapulæ. If, however, bronchitis or other pulmonary disorder should extend to the lower lobes of the lungs, or if the bag applied as just directed should add to the already existing discomfort in the chest, the ice should be used only in the upper cell of the bag, and that cell should be brought down so that the bottom of it may be on a level with the third or fourth lumbar vertebra, the bottom cell being doubled behind the top one, or hanging empty below it. In this way not only may all injury of

the lungs be avoided, but a remedial influence may be actually exerted upon them, and often to a surprising degree—chiefly, no doubt, through the agency of derivation, partly, however, I believe, through the directly sedative influence of the ice on those spinal centres from which trophic nerves convey nutritive energy to the pulmonary structures.

Having duly regarded, in the manner just indicated, the cerebral and pulmonary disorders often associated with the uterine disease in question, the physician will find that he may treat it successfully by the prolonged use of the Spinal Ice-bag. The longer each application of it is continued, provided always that the patient experiences no discomfort from its use, the sooner will success be attained. But it must be constantly borne in mind that, as a condition of success, this treatment must at least be thoroughly comfortable if not positively pleasant; therefore the medical attendant may feel assured that if the application of the Spinal Ice-bag causes either pain or decided discomfort, it is either applied wrongly or applied too long at a time. In some cases it is inexpedient to apply it for more than twenty or thirty minutes; in others it may be borne until the ice is quite melted on each occasion. But a correct diagnosis of all the pathological conditions of each case, a due consideration of the physiological influence of the ice on each part of the spine in relation to those conditions, and the exercise of sound judgment in determining the part of the spine to which the ice ought to be applied, as well as the length of each application, will enable every medical man of average intelligence and professional culture to avail himself successfully of the therapeutical method in question. A large experience of it justifies me in affirming that when it becomes generally known and adopted, it will be recognised as fraught with great and especial blessings to a large proportion of womankind. By one and the same simple process uterine pain and its frequently associated disorders, difficult menstruation, nausea, vomiting, constipation and irregular action of the bowels, frequent urination, leucorrhœa, and coldness of the feet, are in the great majority of cases completely abolished; and very often cerebral and pulmonary affections, which sometimes originate directly from the same cause as the disorders just mentioned, and sometimes secondarily by their agency, subside simultaneously and entirely under the influence of the same treatment.

Painful Excitability of the Spinal Cord.—In this distressing malady I know of no remedy the efficacy of which can be compared with that of cold properly applied to the spine. Most of the sufferers from this disorder are women whose automatic nervous centres are intensely impressionable and excitable both by external agencies and those psychical experiences of which strong and vivid emotions form the chief elements; indeed, in severe and

protracted cases a certain appreciable impairment of the cerebral functions, or lack of complete self-control is observable. Cases of this kind generally tax all the resources of the physician, and often claim from him the friendly and sustaining help of judicious moral influences, as well as medical advice. Methods of treatment are apt to be abandoned before they have been fairly tried: several doctors are consulted, one after another, and the patient who probably becomes an expert in decyphering prescriptions, finding that for the most part they present a general resemblance to each other, and knowing by sad as well as costly experience that they have proved of but little, if of any, avail, loses faith in the healing power of medicine. Hence the more prolonged her experience the less important does it seem to her to conform to her physician's directions, and if on reaching home after consulting him she does not throw his prescription in the fire, as indeed, she sometimes does, she will probably take the medicine prescribed at more or less irregular and distant intervals, hopeless at the same time of deriving any benefit from it. And, indeed, those who have had most experience of the malady in question will be most disposed to acknowledge that such patients are less unreasonable than they seem, that drugs, even when prescribed by the most eminent physicians, really exert scarcely any healing influence on it, and that sufferers from it who have learnt that gloomy truth for themselves, may well be excused when they practically refuse to add to their troubles by continually absorbing more or less nauseous, and for the most part useless compounds. But I do not hesitate to affirm that since the introduction of the Neuro-dynamic method of treatment the prospects of this class of patients have so thoroughly brightened, that their manifold and widely-ranging disorders may be said to have become transferable from the category of all but incurable, to that of completely curable diseases.

Having already adverted to the Neuro-dynamic treatment of neuralgia in general, as well as of those special forms of it in which the application of cold to the spine needs to be made with peculiar care, and having indicated the dangers which may, under certain circumstances, attend the use of ice to particular parts of the spine, I do not think it necessary to describe in further detail the treatment I adopt in cases of the malady now in question. Every medical man who has duly acquainted himself with the pathology of it as explained in Chapter VII., and with the general therapeutical principles fully dwelt upon in the present chapter, will, I believe, experience no real difficulty in applying those principles successfully in the treatment of the hitherto all but intractable disease, which, in fact, as I have pointed at page 127, constitutes neuralgia and its kindred disorders, in their most widely diffused and most varied forms.

CHAPTER XIV.

THE SOOTHING AND AGREEABLE EFFECTS OF THE SPINAL ICE-BAG.

WERE I to adduce all the evidence in my possession that ice applied along the spine in those cases in which it is therapeutically desirable, is agreeable, soothing, and refreshing, I should fill a long chapter with this evidence alone. I must, however, confine what I have to say on this subject within a very short one. Many persons shudder at the bare idea of having a column of ice placed along the back, and think that were it continued there for a moderately short time the discomfort would be extreme, that its continued use would be speedily followed by more injurious results, and, in short, that in any case the remedy would be worse than the disease. These suppositions however, are not justified by experience, which, in fact, completely contradicts them.

At page 289, *et seq.*, I have presented a considerable body of evidence, proving that the Spinal Ice-bag, when rightly applied, possesses in a remarkable degree the power of inducing sleep; and everyone knows that as a general rule the operation of causes producing sleep is far from unpleasant. I suppose, therefore, that my readers will experience no difficulty in recognising that when the Spinal Ice-bag produces sleep, the process by which it does so must involve the exercise of a soothing and comforting influence. Now the delightful sensations induced by any narcotic are proportionate to the real need of sleep felt by the patient at the time he makes use of it, and I venture to affirm in respect to medicines generally, that when the medicine given is really needed, when it fulfils a want indubitably experienced by the patient, when, in fact, its influence is truly *med*-icinal, the patient himself likes the taste of it, and feels its immediate influence agreeable. I have verified the truth of this observation in respect to acids, alkalies, and bitter tonics over and over again. The instincts of suffering organisms, though doubtless sometimes perverted, are, I believe, generally reliable, and I am constrained to think that were they more carefully heeded and more faithfully followed than they are, medicines would not excite those feelings of repulsion or disgust which they commonly do now, and the art of medicine itself, as well as its professors, would cease to be the butt of opprobrious jokes, which being as generally and thoroughly relished as they

are common, in more senses than one, indicate only too truly how little faith is inspired even by the medical art of the nineteenth century.

With reference to the sensations produced by the Spinal Ice-bag, my readers must bear in mind that it is designed not for the healthy but the sick, and only for that portion of the sick in whom has become established precisely that morbid condition of the circulation of the blood in the nervous centres, which the application of cold is of all agents the most capable of subduing. Hence in these cases, and in these only, inasmuch as the Spinal Ice-bag subdues a morbid condition in the very citadels of life, a condition in which the phenomena of the disease in question originate; and inasmuch as the cold restores the circulation of the blood in those nervous centres to its normal state without contaminating or embarrassing the system with any medicines, it seems, *à priori*, that such physiological changes must inevitably be accompanied with sensations of comfort and pleasure, as experience proves them to be. In the case of a person who experiences sickness or nausea when he sits or stands with his back towards a fire, every one can readily understand that no medicine given internally to allay the sickness or nausea would be likely to be so agreeable, and that no treatment would be likely to be so effective as would be a direct reversal of the condition which induced the disorder, viz., the application of cold precisely to the part where the heat had been previously applied. Now the hyperæmia of the spinal and sympathetic nervous centres which is the proximate cause of the sickness, and which is quickly induced by the heat of a domestic fire in the case supposed, is a condition induced by solar heat in cases of summer diarrhœa, by motion which is convertible into heat in cases of sea-sickness, and which produces the same effects as those produced by heat, and by various forms of nervous irritation and excitement which operate as causes of numerous and various diseases. In all such diseases the application of the Spinal Ice-bag must evidently induce feelings as agreeable, and results as beneficial as those consequent on its application in cases of sickness caused by exposing the back to the fire, and precisely for the same reasons; and that such is really the case I will now prove by mentioning a few examples.

The following evidence is extracted from the reports of the *Experiments* published in my pamphlet on "Sea-Sickness."

Case I.—"I don't know, of course, the effects of ice on a long-continued voyage, but I venture to believe that the feeling of perfect comfort would continue as long as the ice is kept on." Case II.—"She felt the cold to the back peculiarly grateful, but wished it more intense; the bag was therefore placed next the skin. This change delighted her." Case VI.—"About twenty

minutes before reaching Boulogne, the ice in the bag was so nearly melted as to cause her to feel that the refreshing and sustaining influence of the cold was lessening; I therefore placed an additional bagful of ice outside her dress, and over the bag already supplied; this sufficed to restore the agreeable sensations she had hitherto enjoyed, and to continue them until she landed at Boulogne." Case XIV.—"He said he felt the cold agreeable and refreshing."

In my pamphlet of "Cases of Diarrhœa and Cholera"* there is the following record :—

"The application of the Spinal Ice-bag is generally felt to be peculiarly comfortable, and in many cases positively pleasant. In Case IV., the child's mother says, 'He seemed to like the Ice-bag; he holds his head down to let the bag be put on directly I tell him the bag is coming, so I think it must be a comfort to him.' In Case IX., the child's mother says, 'She (the child) is well contented with the Ice-bag.' In Case XXI., the child, who usually slept on the Spinal Ice-bag each evening, 'would not go to sleep till he had had it: he insisted on having it.' And Dr. Moorhead, relating his own experience, Case XXVII., says, 'The Ice-bag proved most grateful.' The Director of the Hydropathic Establishment at Melrose, who reported Case XXVIII., writes,—'One thing has much struck me, viz., the liking that sensitive chilly patients have for the cold bag to the spine, although frightened to think of it before they make trial.' Dr. Druitt on one occasion saw some of my patients with me in order to inform himself of the results of my treatment of paralysis and epilepsy. After confessing that he was agreeably surprised by those results, and stating that 'there was no mistaking the testimony of the patients that those results had been most beneficial,' he added, 'I learned from all the patients that the treatment had made them more comfortable—I mean as regards their general feelings of health and animal sensations, without reference to the relief of particular symptoms.'"

Generally speaking, patients who use the Spinal Ice-bag are greatly surprised to find how agreeable it is when rightly applied in suitable cases; but the feelings which it induces differ considerably in different persons. One finds it neither agreeable nor disagreeable, and, judging from his sensations merely, would not know that cold is being applied along his spine at all. Another has a more distinct perception of the fact, and finds the cold rather agreeable than otherwise. Another says it is very pleasant. Another declares it to be wonderfully comforting and delightful;

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* "Cases of Diarrhœa and Cholera treated successfully through the Agency of the Nervous System chiefly by means of the Spinal Ice-bag." Pp. 32, 33.

and often still more emphatic epithets are employed by patients to express the pleasure which the use of the cold induces. I have not often recorded their expressions on this point, but in a few of the reports given hereafter they will be found mentioned. For instance, in Case 10 the patient found no discomfort from the use of the ice, but, on the contrary, she found the ice pleasant. In Case 29 the patient said,—"The ice is beautiful: I don't think I shall ever be able to do without it—it is so comforting." Having suffered a long time from want of sleep, in consequence of pain, she pronounced, as she thought, the highest eulogium on the Spinal Ice-bag when she said,—"The ice makes me long to go to sleep in the daytime, but my business prevents me." In Case 40 the patient experienced distinct relief while the ice was being applied, and found it "very agreeable." In Case 56 the patient said the ice was "rather pleasant than otherwise." In Case 65 the patient said,—"The ice was very comfortable—quite refreshing:" and again she said,—"The relief I felt from the ice I can't describe." In Case 76 the patient spoke repeatedly of the pleasantness of the ice, and having also long suffered from sleepless nights, she too was delighted with what she suspected to be its sleep-inducing charm. She said,—"I can sleep at any time in the daytime now: I fancy the ice draws you to sleep; I don't know whether it is fancy." In Case 80 the patient said,—"I find the ice very agreeable: I look for it, and would like to have it on longer each time." And again she said,—"I go to sleep with the ice on: it's astonishing how pleasant it is." In Case 83 the patient found the ice "very comfortable." In Case 95 the patient was much surprised to find that it was so agreeable. Having passed five days without using it, he felt, he said, the need of it. I asked him what he meant by saying he felt "the need of it," and he replied,—"Why, Sir, I feel that I like it: I feel that it braces me up." In a case of chronic inflammation of the spinal cord, now under my care, and treated by means of the Spinal Ice-bag, the patient exclaimed when it was first applied—"Oh, that's delightful!" and each subsequent application she has found peculiarly comforting and grateful.

But, though the evidence just quoted is strikingly contradictory of the generally-entertained opinion, that ice applied to the spine must be horribly unpleasant, I shall now adduce proofs of a still more decisive and conclusive kind that that opinion is erroneous. That opinion is founded, of course, on the assumption that the Spinal Ice-bag must induce a general feeling of coldness, or even cause shivering in the person to whom it is applied. As a matter of fact, however, in those cases in which its remedial influence is capable of being exerted, or, in other words, when its physiological action is needed, it really makes the patient warm. Now, if it

does, the opinion in question must be erroneous ; and that it does so the following authentic statement of facts, the like of which may be observed and verified by any physician who will make the necessary experiments, prove beyond the possibility of contradiction.

The following quotations are from the records of cases given at the end of the present volume :—

Case I.—Before treatment the patient's hands were generally cold, her feet habitually so ; while under treatment "her feet and hands became continuously warm." Case 4.—The patient, aged sixty, "although warmly clothed, suffered extraordinarily from cold. She had always been cold to the touch, she said, even over the shoulders and bosom. At the end of the first week of treatment her feet had become constantly warm—warmer than she had ever felt them in her life," and within less than a month from the time when she began to use the Spinal Ice-bag she had "become wonderfully warm all over." Case 6.—Before treatment the patient's feet "were always cold ;" during treatment they became quite warm, so that, as her mother said, there was "no longer any occasion to put them in hot water." Case 8.—The feet were usually cold before treatment began ; during its continuance they became "completely and permanently warm." Case 9.—Before treatment the feet were "habitually cold ;" within a month they had become "continuously warm." Case 10.—The feet which had been habitually cold during several years, became quite warm under the influence of the Spinal Ice-bag ; but while it was left off for a few days, before their warmth had been thoroughly re-established, they ceased to be warm. Of course, the re-application of the ice restored their natural warmth as before. Case 13.—Miss B. suffered from general coldness, but her extremities were especially cold—her feet being the coldest. In the course of the first seven days of treatment she found that she became quite warm all over in about five minutes after applying the Spinal Ice-bag ; but that she felt cold again between the applications. At a subsequent date she said that after using the bag for half-an-hour she became so uncomfortably warm that she could not bear it to the end of three-quarters of an hour as prescribed. This experience suggests to me to observe that, in some cases, the extremities become uncomfortably hot under the influence of the Spinal Ice-bag. The lower extremities of one of my patients became so hot that I was obliged to lessen the force of the cold by wrapping the Ice-bag in flannel. Another patient (a paralytic) who, when he came to me, complained, *inter alia*, of being "cold all over," and especially of coldness of the hands and feet, even in the hottest weather, reported, after he had been under treatment somewhat less than a month, that they had

become "very hot—very hot." In Case 14, the hands and feet which, before treatment, were habitually cold, became permanently warm while the treatment proceeded. In Case 22, the patient's extremities, which were habitually cold—the legs and feet being excessively so—were rendered completely and permanently warm by the Spinal Ice-bag. In Cases 23 and 25, the feet, which had been constantly cold, became quite warm; and, in Case 25, the patient's feet became cold again when the use of the Spinal Ice-bag was discontinued. In Case 27 the patient, aged fifty-six, whom I saw for the first time January 20, 1868, suffered much from general coldness, and had become much more chilly than he used to be. His feet were often cold for a couple of hours together after he went to bed; he could hardly sleep for them. Jan. 29, he said: "I've become generally warmer, just as I used to feel several years ago; directly I put the ice on my feet became warm, warmer than I can get them by the fire." Feb. 13, he said: "I continued to keep quite warm while watching* outside Broadwood's premises on a very cold night; I was very warm all night;" whereas previously, as he assured me, when watching on less cold nights, and in just the same clothes, he was very cold. April 1, 1872, he said: "One very curious thing has happened to me; I used to have very cold feet, I may call them excessively cold, in bed; since I've used the ice I never have a cold foot."

In Case 28, the feet which had been "always cold" became warm during treatment. Case 29.—The patient suffered from excessive coldness of both the knees and feet, which became thoroughly warm under the influence of the ice. She said: "If you are lying in bed a short time [on the ice] it's wonderful how warm your feet get." In Case 30, the patient complained, Feb. 26, 1868, that both knees had been extremely cold during, at least, the previous twelve months; and while under treatment, he said, March 14th, "I've noticed particularly that the knees have become much warmer." Case 31.—Before treatment the patient's feet were "always dreadfully cold;" after she had been under treatment about six weeks she said that her feet were decidedly and continually warmer, and that she was warmer all over. She remarked: "I feel myself much warmer with the ice on than when it is off." In Case 33, the feet, previously cold, were made warm by the ice. In Case 37, there was a like result. In Cases 40 and 42, the patients gave similar testimony. In Case 43, the patient reported that the application of the Spinal Ice-bag speedily made her warm all over. At first, fearing that it would make her cold, she sat near the fire

* During the period when attacks by the "Fenians" were talked of.

while using it, but soon found it needless to do so, and having put on the bag when her feet were extremely cold, they became quite warm within half-an-hour. At the end of three weeks from the beginning of treatment, she said she continued wonderfully warm, and that if she happened to be cold when going out to walk, she became warm much more readily than formerly. She also reported that having left off the ice for ten days she became dreadfully cold again. In Cases 45 and 47, the feet became "much warmer" during treatment. In Case 52, the patient reported herself especially improved in respect to increase of circulation, denoted by increased warmth. She said: "I am natural now; I was not natural before, I was so cold; the least thing makes me warm now." In Case 56, the patient, who had suffered from coldness of the feet as long as he could remember, reported that the Spinal Ice-bag had made his feet "immensely warmer." In Case 58, when the patient was first seen, Nov. 20, 1869, she suffered generally from being cold, and her lower extremities, from the knees downwards, were habitually very cold. Jan. 18, 1870, her hands and legs were reported to have become very warm; and her mother volunteered the remark that the child needed less clothing at night. In Case 59, the patient's extremities were extremely cold; "in fact," her mother said, "I might say they are never warm:" within a fortnight after treatment began, she had become notably warmer, and her circulation and temperature steadily improved. In Case 60, the patient suffered "very much" from coldness of the feet, especially at night, but they became quite warm under the influence of the ice. Rose G., Case 68, whose hands were cold and clammy, who was much troubled with coldness of the feet and general chilliness, became generally warm during the first month of treatment. In Case 69, the patient's feet were "always cold:" she said (Feb. 7, 1871), "I have often been kept awake hours with my feet and knees cold." On March 28 she reported, "I like the feeling of the ice; I've not felt cold in bed since I've used it." In Case 70, the patient's feet were "almost invariably cold." After treatment a month she said, "I like the ice; it sends me to sleep." Again, April 18, she reported that her feet had become "decidedly warmer;" and May 8 she said, "the increased warmth of my feet continues." Mrs. L., Case 74, had cold feet "nearly always," and suffered from general coldness: her feet became continuously warm, and she soon recovered her normal temperature generally. Louis C., Case 79, had cold feet habitually: they became thoroughly warm during the first week of treatment. In Case 80, the patient, who complained that her feet were habitually and excessively cold, found that they had become much warmer within seven

days after treatment began. Mrs. A., Case 83, who complained of coldness of the feet and of a feeling as if cold water were poured down her back, was completely relieved of both her troubles by the Spinal Ice-bag. Case 86 (Nov. 25, 1871).—Mrs. P., felt very cold since first attacked with diarrhœa, her feet being "dreadfully cold, like stones." Dec. 2, she said, by the time she had had ice on twenty minutes it seemed to warm her all over: her feet became warmer than they had been for months before. In Case 90, Mrs. J., who had chronic diarrhœa, suffered (Dec. 13, 1871) from general coldness: the cheeks and extremities were markedly cold, the arms being clammy. Dec. 19, her forehead, cheeks, and extremities had become quite warm, and all clamminess had gone. She said, "I fancy the ice draws me to sleep." Whereas her sleep was formerly much broken, she now slept quite soundly, and did not wake till morning. In Case 91, the patient, who had extremely cold feet, reported that she experienced a decided increase of warmth in them within seven days from the beginning of treatment. In Case 95, the patient was troubled habitually with extreme coldness of the feet: they became thoroughly warm during treatment. Case 96 is especially remarkable as an illustration of the power of the Spinal Ice-bag to increase the peripheral circulation and, consequently, the evolution of animal heat. The patient, aged sixteen, had suffered from infancy from a deficiency of circulation, so pronounced as to have been permanently characterised not only by extreme general coldness, but also by blueness of the surface, especially of the face and hands; and he not infrequently had severe shivering fits. By the use of the Spinal Ice-bag the whole body was made thoroughly warm and the complexion florid. In Case 97 the patient, who, after suffering from "faint feelings," grew very cold, and whose feet, her mother said, were "like icicles," ceased altogether to grow cold generally, and her feet became comfortably warm.

CHAPTER XV.

NEURO-DYNAMIC MEDICINE EXEMPLIFIED: AN ANALYTICAL EXPOSITION OF ITS EFFECTS.

In accordance with the principle enunciated and, I hope, established in the preceding pages, that, whatever may be the remote or exciting cause of pain in different cases, the immediate or essential cause in all cases is one and the same, viz., hyperæmia of the sensory centre of the affected nerve, I maintain that there are no essential or fundamental differences in respect to the nature of the pain observable in different cases, however numerous and varied may be the aspects in which it presents itself, and therefore that all cases of disease in which pain is an element are, in so far as the pain is concerned, as really and truly neuralgic as are those in which pain of a kind now generally defined as neuralgia is the only notable feature.

Acting on this conviction, I have included in the collection of cases reported in the next Chapter several which certainly would not be termed neuralgic by the authors of the classification of diseases published by authority of the Royal College of Physicians. This plan while being, as I hold it to be, pathologically justifiable, possesses, in respect to the general object of the present work, some special advantages, which have induced me to adopt it: *Firstly*, by presenting several examples of the successful treatment of ordinary pain, as well as of so-called "true neuralgia," by the Neuro-dynamic method I supply a powerful enforcement of the doctrine here insisted on—of the essential identity of neuralgia and ordinary pain; and, *secondly*, while presenting a number of cases of various and essentially different diseases in which pain is, however, a prominent feature, and, without impairing the monographic character of the present work, I am enabled to adduce from a variety of sources experimental proofs that that system of neuro-dynamic pathology and therapeutics, briefly expounded in the previous chapter, is true, and that the range of its applicability to the human organism is co-extensive with that of disease itself. Moreover, bearing in mind the uncertainty of life, it seems to me especially desirable that I should avail myself of the present opportunity of putting on record the proofs in question; for

if I should be precluded from writing, as I still hope to do, a systematic exposition of the principles and practice of Neuro-dynamic medicine, the following reports, containing as they do an informal exemplification of it, will at least constitute the indestructible foundation of a superstructure, the outlines of which are already traced, and which, if built up by other hands than mine, will assuredly be completed far more speedily than it otherwise would have been if that foundation had not already been laid.

The reports are arranged simply in the order of date at which, in each case, I first saw the patient. In many of the cases the patient presented a considerable assemblage of symptoms, several of which are commonly regarded as distinct diseases, and it would be impossible to designate such cases by any name capable of representing the several, or even the chief, elements of the malady in question. And I venture to remark here, that the more the essential nature of disease in general is truly apprehended, or, in other words, the more that special diseases located in the various parts of the body are regarded as phenomena of disorder in the nervous centres, the more the difficulty of classifying cases according to any really scientific method will be recognised: the highly differentiated and complex human organism is an indivisible unit; in every part of it the spinal cord, by its countless neural ramifications, is virtually present, and every part is represented in the "true spinal cord." It seems to me, therefore, that the lines of demarcation of any conceivable classification of diseases will be inevitably intersected by the all-pervading branches of the nervous system, and will thus be more or less completely invalidated. In proceeding, as I am now about to do, to present an analytical review of the cases reported in the next chapter, I shall advert to their several symptoms, in an order of succession having no claim to a scientific character, but possessing, I think, two advantages: it is simple; and it will probably facilitate the reader's apprehension of the lesson which those cases are capable of conveying to all who will duly consider them.

Facial Neuralgia.—The Neuro-dynamic treatment of this disorder is exemplified in the cases numbered respectively 11, 16, 18, 21, 23, 24, 26, 29, 30, 34, 40, 56, 60, 61, 63, 67, 69, and 82.

Cases 11, 21, 26, 61, and 82, were treated by the application of heat (warm water in the Spinal Water-bag) along the cilio-spinal region, and certainly nothing could be more satisfactory than the effect produced in Cases 11, 21, and 82. In Case 61 I never saw the patient, and prescribed only by letter, after being supplied with insufficient data for a satisfactory judgment: had the use of cold been combined with that of heat the cure would probably

have been complete. In Case 11 the action of the heat in subduing the swelling and tenderness, and in inducing sleep, as well as annulling the pain which the patient suffered, is strikingly manifest. In Case 82, as in Case 11, there was extreme local hyperæmia : "during the paroxysms the parts could not only be felt, but could be *seen* to throb." Guided by this symptom, I deemed it expedient to treat the case by means of heat rather than by cold, in order that by aid of the former a constringing force might be exerted on the blood vessels supplying the medulla oblongata, and on those of the face at the same time. Case 26 affords remarkable evidence of the action of heat applied to the cilio-spinal region in lowering the temperature of the peripheral part influenced, as well as in subduing the pain : "the patient's previously hot and aching forehead became perceptibly cool and moist ;" she remarked that "the inside of her mouth had become much cooler ;" and "the temperature of her cheeks fell so much that they felt cooler than normal."

Among the cases of facial neuralgia treated by the Spinal Ice-bag there is none affording a more wonderful example of its remedial efficacy than that presented by Case 29 ; and it is to be observed that several of the complicating disorders in this case were of a kind which drugs are powerless to remedy. Case 34 is a notable instance of extremely rapid action of the Spinal Ice-bag in annulling severe pain : *the patient had no neuralgia after the first application of the bag, on which almost every night she fell fast asleep.* And in Case 40 the experience, though not so striking, was essentially similar : *the patient "felt distinct relief while applying the ice, which she felt very agreeable."*

Among the interesting features of Case 56 there is an especially instructive one, viz., the apparent "struggle for existence" of the pain before it was finally subdued. I say this is "an especially instructive feature" because it shows that pain is prone to become a habit—incarnated in the organism, and that when it does so, the use of the Spinal Ice-bag needs to be long persisted in before that habit is thoroughly effaced. On one occasion the patient, after reporting himself "a great deal better," remarked,—"There seems a subdued pain, but as if something was struggling with it to keep it down ;" and subsequently, having stated that he continued free from pain while continuing to use the Spinal Ice-bag, he added,—"but I find that if I don't use it the pain comes back : during three days at Christmas I went without ice altogether, and the pain became dreadful. I find I can go over one day without ice, or two at a push, but I can't extend it to three." In a month after making that remark he was able, however, to go without ice for three months together with impunity ; and soon got wholly rid of his tormentor.

Cervico-Occipital Neuralgia is more or less distinctly manifested in Cases 4, 30, 31, 40, and 69 ; but in each of them it was part of a more general neuralgic habit, and was subdued by means of the Spinal Ice-bag along with the more general affection. Case 31 is an interesting example of intense pain, associated with, and probably caused by powerful and persistent clonic contractions of the trapesius and complexus muscles of the right side. Drugs had long been tried without any avail to stop the malady, and I doubt if any other agent than ice could have exerted a curative power over it.

Brachial Neuralgia.—The cases numbered respectively 20, 24, 25, 27, 28, 29, 40, 76, 80, 94, and 98 afford examples of neuralgia of some part, or of the whole of the upper extremity. Of these cases Nos. 27, 28, 29, 40, 76, and 80 are the most remarkable, in respect to severity, extent of range, long continuance and complications, and present, therefore, the most striking proofs of the efficacy of the Neuro-dynamic method of treatment.

Intercostal Neuralgia is exemplified in the cases numbered 1, 5, 20, 25, 30, 37, 39, 40, 47, 49, 50, 51, 54, 58, 64, 66, 91, and 97. That form of this disorder, which consists in neuralgia of the female breast, appeared in Cases 1, 5, 40, and 64. *Mammary neuralgia* often proves persistently rebellious to ordinary treatment ; but it will be seen that in Case 1 the pain, which had lasted several years, was quickly and permanently subdued by the Neuro-dynamic method, and that in the other cases of the disorder, which, however, was comparatively slight, the cure was equally complete. *Infra-mammary neuralgia* occurs in nearly half of the whole of these cases of intercostal neuralgia, viz., in those numbered 37, 39, 47, 50, 51, 54, 91, and 96. As Dr. Anstie rightly observes, pain beneath the left breast "is one of the commonest of all neuralgic affections ;" but I am obliged to dissent from his remark, that women with neuralgic tendencies so often experience this pain "chiefly in consequence of over-suckling, but also from exhaustion caused by menorrhagia or leucorrhœa, and especially from the concurrence of one of the latter affections with excessive lactation" (p. 39). The whole tenour of the pathological exposition already given is opposed to this idea of the causation of the malady ; and I need merely remark here, as I have thoroughly proved, that pain beneath the left breast and leucorrhœa are twin results of one common cause—hyperæmia of the spinal cord : in the one case certain of its *sensory*, in the other certain of its *secretory* cells being a seat of the disorder. The question—what, in the majority of cases, is the exciting cause of infra-mammary neuralgia ? is a very interesting one, and one which, so far as I know, has never received a satisfactory answer. I adverted to the subject at page 62, but since doing

so it has seemed to me probable that irregularities and tumultuous disorders of the circulation of the blood in the spleen constitute the exciting cause of this pain. As a distinctive malady it occurs exclusively in women in whom the nervous and vascular system are more mobile, more easily disturbed, and more liable to disturbance than they are in men; moreover it occurs chiefly in those women in whom the nervous system is peculiarly susceptible and excitable. If so, this organ in such women is the seat of great and rapid alternations of circulation, and, being often both quickly enlarged and again contracted in correspondence with the changes occurring in the general peripheral circulation, it can scarcely fail to exert an exciting influence on the nervous centres more or less immediately related to it, and thus to induce, by reflex action, pain in its own or in neighbouring regions.

Lumbo-abdominal Neuralgia is represented in Cases 10 and 62. Both cases are remarkable by their complications, and No. 10 by the extreme severity and long duration of the pain. Considered in respect to the seat of pain, they are rightly called cases of lumbo-abdominal neuralgia; but I incline to think that in each case the right ovary was one of the chief foci of disorder.

Hypogastric Neuralgia.—Case 68 exemplifies this disorder in a slight degree; in Case 89 the malady was extremely severe, and had recurred very frequently; the patient had been liable to it during her whole life, and, nevertheless, was completely cured.

Neuralgia of the Lower Extremities occurred in Cases 5, 17, 25, 27, 29, 30, 38, 46, 75, 79, 83, and 91. Cases 16, 30, 38, 40, and 79 were well marked examples of that form of neuralgia generally described as *sciatica;* in Cases 5 and 83 (the latter that of a pregnant woman) the crural nerves were especially affected; in Cases 25, 27, and 46 the feet were the chief seats of pain—Cases 27 and 46 were especially severe, and Case 46 presented some remarkable features deserving especial notice.

Back-ache, or Lumbago, is one of the most common of the painful affections from which human beings suffer, and one which drugs are almost powerless to relieve. Aching along some part of the spine often accompanies each of the numerous forms of neuralgia; and the most common kind of back-ache—that located in the lumbar, and in the lower dorsal segments, is almost always associated with disorders of the female pelvic viscera. Indeed, this affection is so common, and so rebellious to ordinary medical treatment, that, as a general rule, women submit to it as an inscrutable and inevitable "dispensation of Providence" which it behoves them to bear in silence. But, just as the magic potency of chloroform is dispersing the superstition that the pains of childbirth are among the unavoidable effects of the "primæval curse," so the power of ice will annul the belief that the pains in

question, which indeed are also mainly connected with disorders of the reproductive organs, defy the power of medical art. In fact, they form a part of that group of maladies which are now most curable. The truth of this statement is rendered indubitable by the experience recorded in the reports of the cases numbered 1, 5, 15, 23, 25, 42, 43, 45, 47, 51, 52, 53, 54, 60, 62, 64, 71, and 91.

General Neuralgia.—In some persons the neuralgic tendency is so pronounced that there is scarcely any part of the body but what becomes in turn a seat of suffering: Cases 12, 25, 29, and 91 are of this kind. The two last cases, in the first of which a complete cure was effected, are deserving of especial attention.

Painful Excitability of the Spinal Cord is exemplified in Cases 43, 60, 69, and 84. Indeed, the difference between this affection and that called general neuralgia is little more than one of degree: the former involves a greater amount of the spinal cord than does the latter, and therefore the phenomena are both more extensive and more various than are those of general neuralgia. The chief characteristics of painful excitability of the spinal cord, or "spinal irritation," as it is commonly called, are excessive tenderness and liability to pain of the whole spine, associated with an extraordinary proneness not only to neuralgia, but also to the development of morbid phenomena of the voluntary and involuntary muscles, of the glandular system, and of textural nutrition.

Headache was experienced in Cases 1, 3, 5, 7, 13, 15, 20, 21, 23, 24, 25, 28, 29, 31, 33, 35, 36, 39, 42, 44, 45, 47, 49, 50, 54, 57, 60, 62, 63, 64, 66, 68, 69, 80, 96, and 98. It thus appears that of the following cases—100 in all—36 were cases in which headache was a more or less prominent symptom. In 35 of these cases the headache was completely cured; and even in the remaining one, namely, Case 69, decided improvement was experienced. The cure of such a proportion *of such cases* is a result the achievement of which would have been impossible except by the Neuro-dynamic method. I say "of such cases," because many of them had been of very long duration, many of them were extremely severe, and many of them presented both these features. In Case 1 the patient had suffered "almost constantly;" in Case 3, the patient "had headache all day every day;" in Case 5, headache "lasted nearly half the day about four days out of seven;" in Case 7, "terrible headaches nearly every day and nearly all day long" were complained of; in Case 24, the patient "was a great and habitual sufferer from headache, from which she was scarcely ever free;" in Case 25, headache "came on each morning;" in Case 28, "great pain in the head, with frequent giddiness" had been suffered "almost every day

for some hours upwards of a month, and both the pain and the giddiness were increasing;" in Case 29, the patient had long been a sufferer from "acute throbbing headache;" in Case 31, there was "severe and persistent headache;" in Case 42, the patient suffered from "very severe headache, continuing all day two or three days a week, and was very giddy;" in Case 50, the patient's chief trouble was headache "almost daily." In Case 54, the patient had been subject to headache "as long as she could remember: it recurred generally every day." In Case 57 the patient "had suffered during five years from attacks of extreme headache, which came on several times a week, which generally lasted ten or twelve hours, and which almost incapacitated the patient from doing anything;" in Case 60, there was excessive pain at the back and base of the brain, and also this remarkable feature, viz., that when absent, the pain was induced not only by any ordinary noise, but even by the laughing or singing of the patient herself; in Case 63, the patient had suffered chiefly at night from "horribly severe" and increasing pain in the head during five or six months; in Case 64, the patient, who often felt giddy, said, "I suffer to stupefaction in the back part of my head;" in Case 66, the patient "suffered every day from a sense of pressure and great pain at the top of the head; in Case 89, the patient suffered from "an almost constant and peculiar headache, a feeling as if her head would burst;" in Case 96, the boy had suffered very frequently from pain across the back and base of his head for several years, in fact, as long as he could remember; and finally, in Case 96, the patient had had very severe frontal headache about four times a week during many months.

Chest-ache.—Cases 47 and 49 are examples of this common affection which, as in these two cases, is often associated causatively with suppression or insufficiency of the menstrual function, and which, as I have said at page 72, is not infrequently the initial stage of phthisis. In Case 47, the pain in the chest was accompanied, as it frequently is in such cases, by pain along the upper part of the dorsal spine; and the menses had been suppressed during four months. In this case the suppression was, doubtless, the cause of the chest-ache; but in Case 49, the chest-ache, though occurring in a woman whose menses had been so scanty during the preceding five months that they were "only a mere show," was not due, I apprehend, to the menstrual deficiency, but to a general disorder of the nervous system, of which that deficiency and the chest-ache, as well as the head-ache, retching, vomiting, constipation of the bowels, and coldness of the feet were a common expression. As will be seen by reference to each of these cases, not only the chest-ache, but all the ac-

companying maladies, vanished when, by the Neuro-dynamic method, their immediate cause, the morbid state of the spinal and sympathetic nervous centres, was removed.

Gastralgia.—Cases 88, 93, 95, and 96 exemplify this disorder in very striking forms, and probably none of the hundred cases here given demonstrate more impressively than these do the wonderful power of the Spinal Ice-bag as a remedial agent. In Case 88, the patient had been suffering with terrible frequency during two months from dull, heavy, gnawing, deep-seated pain in the stomach, followed by vomiting, and had been liable all his life to this malady, which had often completely disabled him; in Case 93, the patient had been afflicted in a similar manner every day during six months; in Case 95, attacks of pain and vomiting, lasting generally from six to eight hours, occurred at intervals, varying in length from a day to a week, during upwards of two years; in Case 96, the patient's paroxysms of "agony in the stomach," as his mother called them, lasted several hours each time, recurred not less and often more frequently than once a week, had continued many years, and were becoming increasingly severe. Nevertheless, in each of these terrible cases, after medical art as ordinarily practised had proved of no avail, a complete cure was effected by the Neuro-dynamic method.

Enteralgia.—Severe forms of this malady are presented in Cases 86, 87, 88, and 90. In Cases 86 and 90 the pain was associated with diarrhœa, and had continued in the latter case about a month, in the former upwards of three months. In Case 87 the pain was accompanied by vomiting and constipation, and had continued about a year; and in Case 89, the patient, who was aged sixteen when she was brought to me, had suffered severely in the manner described "almost from her birth." In each case the pain, as well as the other symptoms complained of, was completely and permanently abolished.

Nephralgia.—The affection generally designated nephralgia, viz., the very severe pain incident to the passage of renal calculi from the kidneys into the bladder, is exemplified in Case 81A. In this case the agonizing pain was wonderfully subdued by the Spinal Ice-bag. Case 92 shows how rapidly pain in the kidneys themselves may be subdued by the application of ice. In this case the pain was, I apprehend, a consequence of nephritis.

Neuralgia of the Testicle.—In Case 70 the pain had been induced about two years before I saw the patient by lifting a heavy weight; in Case 81, it seemed to have originated spontaneously in an otherwise "nervous" patient; but in both cases the disease was thoroughly and permanently annulled in one and the same way—the exertion of a sedative influence over the dorso-lumbar segments of the spinal cord.

Ovarian Neuralgia is presented in Cases 1, 42, and 64, possibly also in Cases 10 and 62, which have already been referred to under the name of "lumbo-abdominal neuralgia." In Case 1, the pain had been of long continuance, and "was increasingly acute immediately before the recurrence of the menses." In Case 42, the pain, which was in the left ovary, was brought on at any time by walking, and in this respect exhibited an interesting likeness to the cases of neuralgia of the testicle already mentioned. In Case 64, the patient had suffered from neuralgia of the left ovary during eight months. It is worthy of notice that both in this case and in Case 1 there was mammary as well as ovarian neuralgia; in Case 1 the left ovary and right mamma were the seats of pain; but in Case 64, the pain both of the ovary and of the mamma was on the same side. Considering the intimate functional relationship between the mammæ and ovaria, we easily understand how likely they are to become morbidly affected simultaneously. I have only to add that in each of these cases the ovarian neuralgia was completely cured by the Neuro-dynamic treatment.

Uterine neuralgia.—The cases of this disorder are extremely numerous, and are numbered respectively—1, 3, 6, 7, 9, 13, 22, 25, 29, 54, 58, 59, 60, 64, 66, 69, 80, 97. In Case 1, the menses were accompanied by "fearful cutting pain;" in Case 3, there was a "dragging pain" in the pelvis, and "a sort of cutting pain in the womb;" in Case 6, the patient suffered extremely during at least two days immediately before, and during the whole of each menstrual period—her mother said, "she is doubled up with pain;" in Case 7, the patient suffered intense uterine pain "of a cutting or griping kind," together with back-ache before and during the whole of her menstrual periods: she could not stand, she said, because the pain was so dreadful; in Case 9, "pinching, drawing pain" was experienced during the whole period of menstruation, and generally during one or two days previously. In Case 13, the pain came on with such terrific severity that she was obliged, she said, "to dance about the room." This "agony" usually lasted about five hours, and subsided temporarily when the flow began, but soon recurred, though with less intensity, the flow stopping meanwhile; in this manner the pain and flow alternated with each other during about five days. In Case 22, the patient suffered extreme dysmenorrhœal pain during the whole period of menstruation; in Case 25, the menses stopped in the day time, and meanwhile there was great pain in the womb and at the bottom of the back; in Case 29, menstruation was "excessively painful;" in Case 54, the patient, aged twenty, had always suffered since she was thirteen years old from dysmenorrhœa with great pain; in Case 59, the patient "suffered fearfully:

throughout the first day she was in one continuous agony, which kept her—to use her mother's expressive phrase—'rolled up in a ball.' The second and third days she suffered less, and could move about. Her mother said, 'the pain is so severe, that though she is not given to crying, she is constrained to cry.'" In Case 60, the catamenia were preluded during about a week by pain in the womb; in Case 64, there was extremely severe menstrual pain, lasting about forty-eight hours; in Case 66, the patient had great pain in the womb at her periods, and had suffered thus during many years; in Case 68, the patient suffered intense pain at her periods; in Case 69, the patient had excessively severe pain in the womb at her periods, lasting two or three days; in Case 80, great pain in the back, womb, and thighs, "in fact, all round," was experienced during two or three days at each period; in Case 97, the patient had intense pain in the lumbar and hypogastric regions during the whole of the first day of her menstrual periods, when she generally felt sick and often vomited.

Of these cases, 18 in number, there were 14 in which the uterine neuralgia was thoroughly cured, and in the 4 remaining cases a remarkable improvement was effected; indeed, had the treatment been persisted in, they also would probably have been cured. But be this as it may, everyone acquainted with the disease in question knows that the cure of 14 out of 18 cases of it, and a decided amelioration of the remainder, is an achievement without parallel in the history of medicine. And all who reflect how terribly prevalent uterine neuralgia is, and how powerless drugs are to relieve it, will be of opinion, I believe, that if Neuro-dynamic Medicine were available for the cure of this disease only, its introduction would be a priceless blessing to humanity.

Hyperæsthesiæ.—Six peculiarly interesting and instructive examples of these affections will be found among the following cases, viz., those numbered respectively 65, 65A, 70A, 70B, 73, and 94. The third and fourth were cases of small-pox. The rapidity with which the previously intolerable itching of the pustules subsided while the Spinal Ice-bag was being applied was scarcely less wonderful than it was delightful to the patients. Cases 65 and 65A represent the development and treatment in the same patient on two successive occasions of a kind of *erythema nodosa*, the irritation of which was extreme. On the occurrence of this affection the second time, Dr. Liveing, who is devoting special attention to skin diseases, was kind enough, at my request, to watch the case with me. The speed and completeness with which the disorder was put an end to was only less satisfactory than was the stoppage of the irritation in the cases of small-pox, because the disorder was less important. Case 73 interested me in a most

especial manner: it was a very remarkable instance of the production of a peripheral disorder by reflex influence from the nervous centre implicated, after the exciting cause—the wound in the wrist—had completely healed; but to me it was still more remarkable on account of the peculiar condition induced in the surface of the palms of the hands—a condition which before I had neither seen nor read of. That condition, consisting of a peculiar smoothness, glossiness, redness, and burning irritation of the surface, I assured myself on the first examination to be wholly of nervous origin, and to have been produced as a sequela of the accident consisting of the cutting the wrist by the broken glass. Some months afterwards, when in the library of the College of Surgeons, I got hold of an exceedingly instructive and interesting book which I had long wished to see, but which, being out of print, I had not obtained, viz., the work of Messrs. Mitchell, Morehouse, and Keen, recording their observations during the recent American War, and entitled, "Gunshot Wounds and other Injuries to the Nervous System," and was surprised and delighted to find my diagnosis thoroughly confirmed by the experience of those careful observers, who have recorded many cases in which injuries of nerves by gunshot wounds produced a precisely similar phenomenon. If, happily, those authors had known of the wonderful efficacy of the Spinal Ice-bag in such cases the unfortunate soldiers who suffered in the particular manner in question might have been saved from their misery.* In Case 94 the irritation was accompanied by an eruption different from the others just mentioned, but it was also abolished with astonishing rapidity. Indeed, it seems from these experiences as if cutaneous irritation generally may be allayed by one and the same method of exciting the sedative influence of cold over the spinal cord.

Cerebro-spinal Fever is exemplified in a very pronounced form in Case 14, and, as it seems to me, quite distinctly in Cases 35 and 36. In a series of papers published in the *Medical Press and Circular* when this grave malady was prevalent in Dublin, I expressed myself fully concerning its pathology and treatment, and gave reasons for believing that the most successful treatment of it would consist in the prolonged application of ice across the occiput and along the spine. Case 14, which I had already treated in that way, gave an encouraging assurance that my expectation

* Dr. Anstie points out (p. 17) "that these skin lesions correspond very nearly, not only to those observed in the cases of nerve injury reported by Mr. Paget, in which, actually, neuralgia was present (though the kind of pain is not exactly specified), but also very nearly with the nutritive changes observed by Mr. Jonathan Hutchinson in a number of cases of surgical injuries of nerves."

was well founded, and this assurance was greatly strengthened by Professor Morgan's experience in a case reported by him in the *Medical Press and Circular* for Sept. 11, 1867. That case is at once so remarkable, so confirmatory of the views expressed in the papers just mentioned, and presents from an independent and impartial witness evidence so indisputable of the action of the Spinal Ice-bag, not only on the nervous centres, but through them on the peripheral circulation, that I am tempted to quote Professor Morgan's report of the case here in his own words.

"The following case I conceive of interest, as it tends to show the value of the Spinal Ice-bag of Dr. Chapman in the treatment of cerebro-spinal inflammation :—

"A lithe and, hitherto, active boy, æt. nine, was admitted at 4.30 a.m., Aug. 27th, 1867, to Mercer's Hospital. His parents state that he was a little ailing the evening previous on going to bed, and shortly after became restless and rambling, picking at the clothes, and in fits as they describe. The symptoms so increased in intensity that early in the morning he was brought to hospital. The raving was now incessant, but he was capable of obeying when repeatedly desired, putting out the tongue rapidly, and with a jerk of the muscles ; face rather flushed ; head retracted ; sterno-mastoid muscles tense ; no dysphagia ; muscles of trunk and extremities moderately rigid, but becoming more so on slight pressure, though not by pressure over spine ; surface warm ; and on examination a curious blush was distinct over the lower half of body, having the appearance of a capillary excitement of the skin, and not of a rash. Pupils enormously dilated, and quite insensible ; there was one attempt at vomiting ; belly slightly tumid ; pulse, 120 ; tongue clean and moist. An Ice-bag not being at hand, cold effusion was used over the head and occiput, with rather tranquilising effect ; turpentine with fœtid tincture administered ; and hydrarg. c. creta, gr. ij. ; pulv. jalapa. c., gr. xij., every two hours ; turpentine stupe to the belly.

"*Eleven o'clock.*—There is now more distinct tendency to spasmodic action of the muscles of a tonic nature, the pupils being observed distinctly to dilate more at the approach of a spasm ; three suspicious purpuric spots on one, and two on the other arm are now seen ; a large-sized Ice-bag was now charged with ice and salt, and applied along the spine from occiput to lumbar region ; the immediate effect was contraction of the pupils, though not to their normal size ; diminution of the spasm and restlessness, and, what was remarkable, of the blush over lower limbs ; belly is rather tumid ; Ice-bag to be refilled at two hours' interval.

"*Evening visit.*—Tension of muscles rather less ; pulse 108 ; blush of lower limbs disappeared ; bowels but once freed ; ordered olei crotonis gtt. ss., calomel gr. iv., continue Ice-bag at two hours' interval.

"*August 28th., nine a.m.*—Slept none ; delirium and restlessness constant ; the arms at times rigidly stretched out ; twitchings of muscles of face, which is now rather pale ; pulse 100, weaker ; tongue moist ; pupils still dilated ; muscles not so tense, and certainly relieved on each refilling of the Ice-bag ; the belly still rather tumid, bowels once moved ; calomel and croton oil to be repeated, and followed by sulphatis quinæ, gr. v., every three hours ; iced beef-tea to be freely given ; continue the Ice-bag without intermission.

"*Evening visit.*—Rigidity of muscles yielding ; pupils slightly contracting, can obey directions ; bowels once moved ; slept once in the afternoon ; pulse 100 ; tongue clean ; herpes of upper lip now appearing ; continue the quinine and beef-tea and Ice-bag at three hours' interval.

"*Half-past nine a.m., August 29th.*—Decidedly better; consciousness returning; pupils contracting; can recognise faces and answer questions; rigidity relaxing; can bend the head forward so as to touch chest with chin; has slept five hours; herpes about the size of threepenny piece. To continue quinine and beef-tea, which latter he takes freely; the Ice-bag continued at four hours' interval.

"*Evening visit, August 29th.*—Improvement so manifest that the Ice-bag is dispensed with. Quinine and beef-tea continued for the present.

"*September 1st.*—The boy is allowed home, and to attend the dispensary. The service of the Ice-bag in this case was a diminution of the excitement and delirium, and the effect on the pupils was very remarkable, the contraction occurring within a few minutes after its application. It might be supposed that the continued application of so large a bag of ice would have caused some local mischief, but such did not appear; allowance was made for some difficulty in keeping the bag applied, owing to the patient's condition."*

At the close of his report Professor Morgan gives an account of "the conditions under which the attack came on" in six cases which came under his care: of these six cases, the only one which did not prove fatal was the only one which was treated by means of the Spinal Ice-bag; and he observes,—"This one has been saved, as I believe, by the use of the Ice-bag, in combination with the free exhibition of quinine and support."

Cramps and other Disorders of Voluntary Muscles.—That very common and very painful affection, cramp of the muscles of the lower extremities, is, so far as I am aware, incurable by any known drug; but whether it be of that kind which attacks otherwise healthy persons, and which comes on only at night—not seldom as an habitual visitant, or whether it occurs only as an accompaniment of other diseases, severe diarrhœa, for example, it is easily and completely subdued by the Spinal Ice-bag. Cases 4, 5, and 40 are good examples of the former, and Case 96 of the latter. I may add here that the "Cases of Diarrhœa and Cholera" which I have published present a considerable body of evidence to the same effect. Moreover, and the fact is of capital importance, cramps are not only subdued by this method of treatment, but their tendency to recur is abolished: in numerous cases which have come under my observation, persons who have suffered for years from cramps coming on in the night have been completely and *permanently* relieved from them by means of ice; indeed, Cases 4 and 96 confirm the truth of this remark.

Spasmodic contraction of voluntary muscles of that gradual and gentle kind which does not amount to cramp producing severe pain, but which disables the patient, is exemplified in

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* "The Spinal Ice-bag in Cerebro-spinal Inflammation." By John Morgan, F.R.C.S.I., Professor of Descriptive Anatomy to the Royal College of Surgeons of Ireland. *Medical Press and Circular*, September 11, 1867.

Case 5. Two other cases of this kind, but in which the disorder was more pronounced, have come before me: in one of these cases the patient was a sempstress, who, owing to the involuntary and tonic contractions of the flexor muscles of both hands, was incapable of continuing her work; in the other the patient, who is an eminent pianist, was affected in like manner, and so severely that he was disabled from playing; and in both these cases, as in Case 5 just referred to, a rapid and permanent cure was effected.

Another form of muscular contractions is that exemplified in Cases 4 and 32, viz., that of clonic but continuously recurring spasms; in the one case the muscles of the lower jaw were affected, in the other, in which there was great suffering, those of the neck were the seat of the disease. In this last case the patient had been, during a considerable time, under the care of one of the most eminent neuro-pathologists in London without deriving any substantial benefit.

There is still another and a very distressing kind of involuntary contraction of voluntary muscles, which, indeed, is on the borderland of epilepsy, and which may be referred to here because it is exemplified in Cases 7 and 12. I mean those violent *jerks* or *starts* with which some patients are troubled, and which in some cases, as in Case 7, are so violent as to throw the patient down.

In each of these cases a cure was effected by the Neuro-dynamic method.

Epilepsy: le grand et le petit mal.—As I have had considerable experience of the remarkable efficacy of the Neuro-dynamic method in the treatment of epilepsy, I intend to publish a separate treatise on the subject; meanwhile, as the disease appears in Cases 1, 6, 7, 9, and 96, especial attention is invited to those cases. Case 6 was one of very severe epilepsy (*le grand mal*), which had continued from childhood, and which manifested itself most terribly at the patient's catamenial periods. She was under treatment only four months; nevertheless, the fits gradually became less in number, much shorter, and less severe, and at her third catamenial period after the treatment began the patient, for the first time in her life, menstruated without having a single fit. In Case 9 the patient had attacks of *le grand mal*, generally about three fits a month, and always at her catamenial periods. While under treatment she menstruated on three successive occasions without having a fit—a fact surely very significant and important, although she was not cured of her malady. In Case 96, which was one of extremely severe *petit mal*—the attacks being not only frequent, but more prolonged than in any other case of *petit mal* I ever met with—the improvement effected was so great and striking, and was accomplished in so short a time, as to justify the convic-

tion that the patient would have been completely cured if only his poor, struggling parents could have borne the expense of the ice two or three months longer. In Case 1 of *petit mal* occurring every day, and in Case 7 of both *petit et grand mal*—a very severe case—a complete cure was effected.

Fainting Fits, or cases of anæmia (more correctly *hypæmia*) of the brain resulting in loss of consciousness more or less complete, are, in respect to their essential nature, nearly akin to epilepsy; nevertheless, there is a difference which justifies the distinctive name by which they are commonly designated. In the case of severe brachial neuralgia numbered 76, fainting fits were a prominent complication, and were generally induced by the agonising pain which the patient suffered. She began to be afflicted with them between two and three years before she first consulted me; and since they first came on they had usually recurred several times a week, but occasionally two or three times a day. My treatment of her began May 25th, and was continued uninterruptedly until June 16th, when it ceased because she was "unable to get ice," and was not resumed until June 22nd. During the continuance of the treatment she was quite free from fits; but June 18, while she was without ice, "she became very ill and fainted away with pain;" and, again, June 21st, "she fainted twice from the same cause, and lost her consciousness completely." On June 23rd the treatment was recommenced, and since that date the patient has never had a fit. I may add that I have been consulted in several cases of fainting fits, and that the Neuro-dynamic treatment of them has been attended with one uniform result,—their rapid and complete abolition. In respect to this malady Dr. Wm. Playfair has verified my experience, and has kindly given me the report of a case in which he also effected a cure by the use of the Spinal Ice-bag. In a recent case of this kind I was called (April 26th, 1872) in consultation with the ordinary medical attendant of the patient, Mrs. ——. She was then having frequent and prolonged fits almost daily; but from the day the treatment which I advised was begun until June 10th, when I last saw the patient, she had not had a single fit, and was wonderfully improved in several other important respects.

Tinnitus aurium (*singing in the ears*).—This obscure affection, which occurred in Case 1, and which was a constant trouble to the patient, was completely cured along with the other disorders, including *le petit mal*, from which she suffered. In several other cases a cure has been effected by the Neuro-dynamic method; but recently a case of this kind under my care proved incontrollable. I call the disorder "obscure" because we seem unable as yet to ascertain what is the precise mode of production of the subjec-

tive sounds in question. I have assured myself that the proximate cause of them in the majority of cases is *hypæmia*; but in some cases they seem to be due to an opposite condition of the cerebral circulation, and thus, *in this respect*, are probably analogous to sleep, which may be produced as a consequence of both hypæmia and hyperæmia of the brain. In those cases which are incurable by the Neuro-dynamic method, by which the cerebral circulation may have been increased or lessened in accordance with the symptomatic indications, a permanent change, of the kind usually called structural, has probably occurred in the nervous centres functionally related to the auditory apparatus, or an exciting cause of the morbid phenomenon in question continues to operate, and may be irremoveable—indeed, most likely, undiscoverable.

Subjective Spectra.—Just as there are subjective sounds and, I may add, subjective smells, so there are subjective spectra, which, indeed, are experienced quite as often, perhaps, as subjective sounds, and certainly much oftener than subjective smells. Case 4 affords an interesting example of this kind: the patient was much afflicted in the night by the vision of a very bright light—"brighter than any bude-light I ever saw," she said, and, simultaneously, with an "inexplicable feeling of thorough terror and distress, which frequently compelled her to get out of bed and pray to be relieved of it." These morbid experiences, as well as several others which accompanied them, were completely put an end to by the treatment adopted.

Giddiness occurred in Cases 28, 45, 53, 64, 75, and 100. In Case 28, the patient had been troubled with frequent giddiness, along with great pain in the head, almost every day during some hours for upwards of a month. She was first submitted to treatment in the middle of January, 1868, and in the middle of the following April had become quite well. In Case 45 there was frequent giddiness, which rapidly lessened under the influence of the Spinal Ice-bag. Unfortunately, I did not see the patient after I last prescribed for her, and am therefore unable to report the final effects of the treatment in her case. In Case 53 the patient suffered from great giddiness, which often caused her to reel. She said, "After sleeping I wake up so dreadfully giddy." Her giddiness was associated with pain in the head. At the end of two months from the time when her treatment began, the trouble in question had ceased entirely. In Case 64 giddiness was a frequently recurring symptom, which was associated with pain in the back of the head, and which, under treatment, subsided along with it. In Case 100 the giddiness was an accompaniment of sciatica, and the two were cured simultaneously.

Sleeplessness and its successful treatment are exemplified in

Cases 10, 13, 48, 61, 63, 74, and 75. Of course, in the majority of cases sleeplessness has an obvious cause—severe pain, for example ; and in such cases sleep is at once procured when its preventitive is removed. In Case 10 the patient was greatly enfeebled by the want of sleep, such sleep as she had being procured only by means of narcotics. She was kept awake by terrific pain. In Case 13 the patient's sleep "was generally broken and unrefreshing" because her nervous system was generally disordered. In Case 48 the patient was in constant pain during the night so that, as she said, she only dozed a little when overpowered with exhaustion. In Case 61 neuralgic attacks, usually lasting from 10 p.m. till 3 a.m., precluded the possibility of sleep. In Case 63 the pain was so horribly severe at night that the patient often walked about the room, being unable to rest in bed. She said, "I get about a quarter of an hour's sleep, and then lie awake all night." In Case 74 the patient was kept awake half the night by "burning heats," followed by coldness. In Case 75 sleep was prevented by intense pain in the head and sudden and extreme flushing, followed by profuse perspiration. In Case 76 the patient said, "If I had my choice I'd rather go through my labour pains than bear what I have to suffer of a night." She often sat up a considerable part of the night from fear of the pain coming on. And finally, in Case 67, during a period of about three years immediately before the patient consulted me she suffered so severely at night that, as a rule, she was dependent for what sleep she had on alcohol, opium, morphia, chloroform, or hydrate of chloral.

That neuralgia is prone to be much more severe during the night than during the day is a recognised fact—a fact which I have endeavoured to explain at page 171 *et seq.* The physiological condition of the nervous centres which I have shown to be the proximate cause of this tendency is one which is peculiarlycapable of removal by the Neuro-dynamic method of treatment and by no other; and hence it is that Neuro-dynamic medicine possesses sleep-giving power in a pre-eminent degree. It is to be expected that inasmuch as all the cases here reported are characterised by the presence of pain as a prominent symptom, the sleeplessness notable in several of these cases would be due to the increasingly-severe pain at night, and that its cure was effected by abolishing that pain. I must add, however, that in cases which have come under my care, of insomnolence unaccompanied, and therefore not caused, by pain, the sleep-giving power in question is not less strikingly manifested ; indeed, even in cases in which that symptom is not a prominent feature of the malady under treatment, and in which pain is not experienced, refreshing sleep is often induced incidentally by the Neuro-dynamic method. Numerous proofs of the truth of this statement are given at page 289 *et seq.*

Talking during Sleep.—In Case 5 the patient habitually talked "nonsense" in her sleep; and in Case 96, even when the patient, a boy, was quite free from his gastric and enteric troubles "he often talked in a rambling manner as if delirious" during sleep. In both cases the disorder was rapidly and completely cured by means of the Spinal Ice-bag.

Tendencies to Insanity were observable in Cases 29, 34, and 75. In Case 29 the patient's mind had become seriously impaired; she experienced great mental confusion and loss of memory. She was in the habit of sitting for hours without speaking to any one. When her attacks of headache and neuralgia came on she was seized with an irresistible feeling of dislike of her husband and children, and wished them away from her. In Case 34 the neuralgia was usually associated with headache, more or less general, confusion of ideas, mental apathy and depression. In Case 75 there was melancholy and a tendency to suicide. In each of these cases a complete cure was effected. The cerebral disturbances here indicated were comparatively slight; but experience has proved that in graver cases great benefit can be conferred. In one case under my care in which the patient had been haunted during several years by fixed and delusive ideas, a complete cure was effected by the Neuro-dynamic method. In another case the patient was so grievously afflicted that his relatives felt the gravest apprehensions concerning him: he became disqualified from continuing his usual work; he shrank with terror from seeing visitors, whose approach often made him tremble and break out suddenly in perspiration; he suffered from attacks of great depression or melancholia; sometimes he was wildly excited; and not unfrequently it was necessary that he should be carefully watched lest he should harm himself. In this case a complete cure was effected by the Neuro-dynamic method; and if at any time subsequently he over-worked himself, as he was apt to do, and had a relapse, he was again rapidly restored by the same method. I may add here that in a case of incipient insanity, under the care of Dr. Brereton, of Sydney, he treated the disease, as he informed me, successfully by means of the Spinal Ice-bag; that the late Dr. O'Ferrall, of Dublin, gave me an account of a case of acute mania, suddenly developed in a patient in St. Vincent's Hospital, and which was rapidly subdued in the same way; that a lady suffering from "hysterical mania" was restored to sanity during the first day of treatment by the Spinal Ice-bag, which was prescribed by that eminent physician—the late Dr. Symonds, of Bristol; that Dr. Allbutt, of Leeds, has found the Spinal Ice-bag "strikingly successful in maniacal conditions;" and that at the Asylum at Ticehurst, in certain cases of insanity associated with cerebral hyperæmia, heat applied by means of the

Spinal water-bag has been found to exert a powerfully beneficial influence.

Impairment of Memory was a distinctive feature of Cases 29 and 76. The patient, in Case 29, said,—"I can scarcely recollect anything: I've often given people wrong change at the counter" (she kept a small shop). This was the state of her memory January 25, 1868, when I began to treat her; and already, in the middle of the following May, her memory was so much improved that she said,—"I can recollect anything now." In Case 76 the patient, when I first saw her, in May, 1871, complained especially of her loss of memory; but in the following July, while still under treatment, she volunteered the remark that her memory was improved. This satisfactory result in these cases was undoubtedly due to the establishment of a regular and equable circulation of blood in the brain by the sedative action of the Spinal Ice-bag, chiefly on those nervous centres which control the cerebral circulation, but partly also by the like action on the spinal cord, many of the fibres of which are directly continuous with those of the brain itself.

Impairment of Sight was a prominent symptom in Cases 3, 4, 7, 27, 29, and 57. In Case 3 the sight before treatment was so feeble and dim that the patient, aged thirty-five, could not tell the time by the church clock, which was close to her house; and one object often appeared to her, she said, as several: after the treatment had continued eighteen days the patient declared that her vision had become quite clear and normal. In Case 4 the patient, who complained that her sight was often dim, found that it had become "much clearer" after she had applied the Spinal Ice-bag as directed during only one week. In Case 7 the patient could not distinguish objects or recognise persons at a moderate distance from her. If she read, her eyes became suffused with tears, and on dark or dull days she could scarcely read at all. Both her pupils were remarkably large, and contracted very slightly in the presence of light. She complained that her eyes were gradually getting worse. With the right eye she could only read test type (Snellen's) No. $3\frac{1}{2}$, and with the left No. $2\frac{1}{2}$. This was the condition of her eyes August 7th, 1863, when I began to treat her. By September 24th the troublesome lachrymation had quite ceased, the pupils had contracted to their normal size, the eyes felt much stronger, and the patient could see distant objects much more clearly than formerly. In the latter part of October, when the patient was dismissed from the hospital cured of all her grave maladies, her pupils continued normally contractile, and her visual power had so improved that she could read test type $1\frac{1}{2}$ with each eye. In Case 27 the patient, who was fifty-six years old, was unable, when I first saw him, to read smaller test type

than 5½ with either eye; after treatment, during only three weeks, he could read test type 4½ easily and 3½ with difficulty. In Case 29 the patient, who complained that during the onset of her neuralgic paroxysms the sight of both her eyes became dim, reported that one of the results of the treatment which she underwent was a great improvement of her visual power. But of the six cases here given, in which vision was improved by the Neuro-dynamic method, that numbered 57 is incomparably the most remarkable. During full five years the patient had suffered from temporary and frequently-recurring blindness, which was rapidly, completely, and permanently cured by that method—heat being the agent employed. Mr. Ernest Hart has published an account of a Case of Amaurosis, in which a wonderful improvement was effected by the Spinal Ice-bag; and one of my patients who was suffering from Diabetes, and who was cured by the Neuro-dynamic method, found his visual power so much increased, quite incidentally, that he wrote to me,—"But the most wonderful thing is that, whereas during the last thirty years I have been in the habit of wearing spectacles, my sight is now so improved that I never use them, unless there happens to be a dull light."

Numbness, or Impairment of Sensibility, was experienced in a marked degree in Cases 27, 28, and 76. In Case 27, the numbness of both hands, when the patient came to me, was such that he could not feel the two points of the æsthesiometer in his right palm until they were eight lines apart, and not until they were twelve lines apart in the left. He was treated exclusively by the Neuro-dynamic method, and in nine days his sensitiveness had so improved that he had become able to feel two points at four lines apart in the right palm, and at three lines apart in the left. In Cases 28 and 76, the numbness was greatly heightened at the beginning of the neuralgic paroxysms. In Cases 27 and 28, normal sensitiveness was completely restored. In Case 76—a very severe one—the patient found it very difficult to supply herself with ice, and her experience affords an instructive example of the alternate decrease and increase of the numbness in correspondence with her use or disuse of the Spinal Ice-bag.

Partial Paralysis is exemplified in Cases 27, 29, 30, 40, and 76. In Case 27, the upper extremities were chiefly affected, and the patient's fingers had become so weak that he was disabled from continuing his usual work, that of making the tops of Broadwood's grand pianos, an employment which involves the exertion of great force by the fingers in the scraping of the wood. When he had been under treatment three weeks, his hand, and especially his fingers, had become much stronger: he could already scrape the wood far more effectively than he had been able to do for many months previously, and at length his hands

became thoroughly strong again. In Case 29, the paralytic symptom, associated with the numbness which was present, consisted chiefly in a feeling of heaviness of the lower extremities—the right being most affected. In Case 30, the patient suffered in a very similar way, so that he was sometimes unsteady in walking, especially when going down-stairs. In both these cases the patients re-acquired normal strength in the affected limbs. In Case 40—a case of brachial neuralgia—the right arm and hand became "partially paralysed at times:" after she had been under treatment a month, she reported that they had become decidedly stronger. In Case 76, the attacks of brachial neuralgia from which she suffered were accompanied with paralysis: the patient said,—"The arm seems to be immediately paralysed;" if she had anything in her hand she was obliged to drop it, unless it were taken from her. She was obliged to give up her ordinary domestic duties, and, for many months before she came to me, she had been unable to dress herself. At the end of two months of treatment, in reply to my inquiry what evidence she could give me of improvement in her arms, she said,—"Why, being able to use them: I can now dress myself easily, and can use my needle."

That the efficacy of the Dynamic method of treating paralysis is remarkably great is attested by the reports of several striking cases published by me in the *Medical Press and Circular* for May 1st, 8th, and 29th, 1867, and by the confirmatory experiences of several physicians, among whom I may especially mention Dr. J. H. Benson and Dr. Hewitt, of Dublin, and Dr. Townsend, junr., of Cork.

Disorders of Local Nutrition (*Trophic Phenomena: Swelling and Tenderness*).—These disorders are among the most generally recognised and characteristic complications of neuralgia, and have often, therefore, been adverted to in the preceding pages. Swelling and tenderness of the scalp are exemplified in Cases 11, 29, and 92. In Case 11, the neuralgic attack, with its accompaniments, was of recent origin, and as an example of the rapidity with which, in such a case, the phenomena in question, as well as the pain, may be subdued by the proper application of heat, it is especially instructive. In Case 29, the swelling, which was most notable in the forehead, was accompanied by a sense of "burning heat," which, along with the pain, often invaded the roof of the mouth. In Case 92 the tenderness of the scalp was very pronounced.

The face was accustomed to swell during the attacks in Cases 56 and 82; in the latter case the focus of pain was not only swollen, but became very red, and could be seen as well as felt to throb. In this case heat to the cilio-spinal region acted like a charm.

Swelling of the back of the neck, expressive of reflex action through trophic nerves morbidly excited by sensory nerves distributed to the wrist which had been wounded, is notable in the remarkable case, No. 73, to which I have already called special attention. In Case 28 there was also some swelling and tenderness in the cervical region, which were completely subdued by the treatment adopted.

Diminution of swelling of the hands by the Neuro-dynamic method is exemplified in Cases 14, 18, 28, 35, 36, and 76. I saw the patient, whose case is numbered 18, at several other times besides those mentioned in the report; and certainly he was thoroughly assured that a direct remedial influence was exerted on his hands by the application of ice to the back of his neck. Case 28 is a striking example of a morbid affection restricted almost exclusively to the trophic nerves of the hand: about three times a week for several weeks immediately before I saw the patient her left hand had swollen, and had become hot, red, and numb; it was not painful, but before swelling it itched during a few minutes; the swelling lasted upwards of an hour. Under the influence of the Spinal Ice-bag this curious phenomenon soon ceased entirely. In Cases 14, 35 and 36, the action of the disordered spinal cord was strikingly manifested through the trophic nerves of the hands, and in these cases the remedial power of the Spinal Ice-bag over the disorder, as observable in the hands, was not less striking. In Case 76, the hand became swollen and red every time the patient experienced a severe neuralgic paroxysm, and in her case the swelling and redness were beneficially controlled within a week after the Spinal Ice-bag was first applied.

The lower extremities also exhibited the morbid action of the trophic nerves in Cases 3, 14, 18, 35, 36, 38, 46, and 77. In Case 3, the legs and feet were habitually swollen; but in this case the swelling was, I apprehend, due rather to a lack of vital force in the capillary circulation, resulting in passive exudation into the tissues, than to any excessive action of the trophic nerves; in Case 18, the swelling of the knee and ankle, which was considerable, and probably of gouty origin, was reduced with surprising rapidity; in Cases 14, 35, and 36 the swelling was generally diffused over the lower extremities, and, in the first of these two cases, there were numerous ecchymoses; in Case 38, the swelling of the knee came and went as an ordinary neuralgic complication; in Case 46, there was swelling of the right ankle—most probably of a gouty nature; and in Case 77, the swelling in question, which was very pronounced, was undoubtedly due to gout. In all these cases the disorder was swiftly and entirely cured by the Neuro-dynamic method.

The Development of the Mammæ Influenced by the Neuro-dynamic Method.—In Cases 1, 5, and 85, the mammæ were notably affected.

In Case 1, the left mamma was considerably smaller than the right ; in Case 5, though the left mamma was very considerably developed, the right one was, as her mother remarked, "a mere piece of skin—quite flat." Under the influence of the Neuro-dynamic treatment the left mamma in Case 1 became equal in size to the right, no difference between them being discernible ; in Case 5, the right mamma was so developed that the difference between the right and left was scarcely distinguishable. During the treatment the pain in the right breast in Case 1, and the rather hard and painful swelling in the left breast in Case 5 disappeared. In Case 85, one of the incidental results of the treatment adopted was a development of the mammæ so considerable as to cause the patient to express her belief that had she submitted to the treatment earlier she would have become a mother.

In this connexion I may mention a very remarkable case of a man whose testicles were made to swell so considerably as to become painful every time the Spinal Ice-bag was applied in the dorso-lumbar region.

Globus Hystericus.—In Case 38, the patient was distressed by "a burning lump" in her throat, which especially troubled her when she swallowed. It was quickly and completely got rid of by the use of the Spinal Ice-bag. The patient in Case 83 was pregnant : she was tormented with a feeling in her throat, which she insisted was caused by a fish-bone that she had "swallowed" about three months previously. The distress produced by it had, she declared, been increasing ever since. The patient was submitted to the Neuro-dynamic treatment October 4, 1871 ; on the 10th she reported that her throat was "ever so much better," and that it did not wake her in the night as formerly ; on the 24th she said the throat continued "very much better ;" and, on Nov. 7th, she reported that the application of the upper cell of the Spinal Ice-bag along the cervical spine relieved her each time it was applied. As the feeling complained of was a phenomenon of reflex action, originated by the growing ovum, it was to be expected that the tendency to its reproduction would continue, as it did, until the patient was delivered. Meanwhile, its subjugation by the Neuro-dynamic method is a fact as interesting and instructive as it is important.

Shortness of Breath.—In Case 13, in which the difficulty of breathing was especially pronounced, a great improvement was effected ; in Case 39, the like difficulty was removed altogether ; in Case 45, the patient who, along with a cough, suffered from shortness of breath when going up-hill or up-stairs, declared that she had become much better in this respect. These are the only cases among the hundred here given in which I appear to have noted the symptom in question ; but it is probable that in some of the other cases in which there were chest symptoms, and in

which a cure was effected, difficulty of breathing, though not noted, was one of them. Speaking from experience in other cases, in which shortness of breath has been associated with inadequate performance of the menstrual function, I can state positively that in numerous cases this symptom, though very marked, has been made to vanish entirely by the Neuro-dynamic treatment.

Cough was complained of in Cases 13, 39, 50, 53, 80, 94, and 97. In Case 13, the lungs were very feeble and delicate, the whole constitution was especially weak, and the menstrual function was particularly inadequate and unhealthy. But, even in this case, so much was done to allay the cough by improving the health of the nervous system, and thus, *inter alia*, at once increasing menstruation and rendering it painless, that, though she did not cease to cough altogether, she ceased for considerable periods together, and gained immensely in general health and strength. In Case 39, the patient had what she called "a dreadful cough," of which she was completely relieved by the use of ice alone, so applied as to increase the circulation in the pelvic viscera and lower extremities. In Case 50, there was a cough, which was cured on the same principle and in the same way as the one in Case 39, the only difference being, that in Case 50, besides using ice, the patient took, during the first week of treatment, an ounce of infusion of calumba twice a day. Case 53 is a remarkable example of the cure of a distressing chest affection without drugs, and without any application to the chest: the patient slept soundly, except that frequently, though not every night, she was seized with a violent cough, which lasted from a few minutes to two hours, and caused a distressing "dragging" sensation at the base of the chest. The Neuro-dynamic treatment was the same in this case as in the two cases last mentioned, and was only supplemented by the prescription of aperient pills, to be taken when the bowels were confined: the cough was rapidly and completely cured. In Case 80, cough, which was a prominent symptom, was markedly lessened within a week, and was speedily cured completely by the Neuro-dynamic treatment, the only addition being infusion of calumba. In Case 94, a boy, who had suffered during several months from "a very bad cough indeed," especially during the night, was quickly and completely cured. In Case 97, the patient had a severe cough which troubled her both winter and summer, and which, without any drugs, and without any applications to the chest itself, was so nearly abolished by the Neuro-dynamic treatment, continued during six weeks, that at the end of that time it scarcely troubled her at all.

Expectoration was a prominent symptom in Cases 13, 53, 80, and 97. In Case 13, it was so subdued that it continued absent

for months together : and in the other cases it was abolished completely by the Neuro-dynamic method, without drugs, and without any applications to the chest itself.

In the course of this commentary, only those chest affections are adverted to which presented themselves incidentally along with other disorders ; but even these few cases will supply precious intimations to those who will duly consider them ; and my experience enables me to add the assurance that, in the treatment of this group of disorders, the remedial power of the Neuro-dynamic method is extraordinarily great.

Nausea and Vomiting.—These distressing symptoms, which are of very frequent occurrence, and which, in a large proportion of case, are incontrollable by drugs, presented themselves in Cases 10, 22, 23, 24, 31, 43, 69, 72, 74, 83, 87, 88, 93, 95, 96, 97, 98, and 99. In Case 10, the patient had suffered during many years nearly every day from nausea, and occasionally vomited "water ;" in Case 22, the patient "vomited more or less throughout each menstrual period, and suffered much from nausea :" in both these cases the sickness was completely and permanently cured. In Case 23, the patient made the astonishing statement that since childhood she had vomited every morning of her life, and that her mother and two sisters were affected in like manner : I prescribed for her on the first occasion, Dec. 18, 1867, and ten days afterwards she reported that she had not vomited at all since the ice was applied the third time. She was poor, and lived unhappily with her husband, and finding it difficult to pay for the requisite amount of ice, she soon failed to apply it regularly ; and Feb. 15, 1868, she reported that she was troubled with sickness about every other morning. She was then urged to use the ice more persistently ; and March 4th, she reported that though she still felt nausea occasionally, the vomiting had ceased. In Case 31, the patient suffered from "frequent vomiting—especially in the morning : the smallest disagreeable smell made her vomit." At the end of the first fortnight of treatment her vomiting stopped altogether. In the remarkable case, No. 43, the patient volunteered the assurance that the Spinal Ice-bag stopped her sickness. In Case 72, the patient strained himself by carrying a heavy load, and during each day after the accident, until I saw him, he vomited the greater part of each meal a few minutes after taking it : by the Spinal Ice-bag alone his sickness was immediately and completely stopped. In Case 74, nausea and vomiting of six months' duration were thoroughly abolished within a fortnight from the time the treatment began. In Case 87, the patient had also been troubled, during a long period, with the like symptoms, was completely relieved of them, and as rapidly as in the previous case. The remarkable case, No. 88, is worthy of especial atten-

tion as a proof of the power of the Spinal Ice-bag, not only in stopping severe and persistent vomiting, which drugs fail to control, but in removing the cause of the malady. Case 92 exemplifies the same power : in this case the vomiting was due to inflammation of the kidneys. In Case 93, the patient had suffered during about five months from vomiting, which ceased completely and permanently as soon as the treatment had been continued a single day. In Case 95, the patient had suffered during more than two years from severe attacks of vomiting, which usually lasted from two to four hours, and which recurred oftener than once a week : not until exactly a month had elapsed from the time the treatment began did the vomiting recur; it was then experienced but once, and from that date finally ceased. In Case 96, the boy, sixteen years old, had suffered from very frequently recurring and severe attacks of vomiting since his infancy : from the time I began to treat him, March 18th, 1872, the vomiting steadily lessened, and on the 3rd of April following it ceased altogether. Cases 98 and 99 are truly wonderful instances of the efficacy of the therapeutical method in question. In Case 99, the patient vomited nearly every day, from Oct., 1871, to April, 1872, when I first saw her : her treatment began April 26 ; on the 28th the vomiting was markedly lessened ; on the 29th it ceased, and it has never since recurred.

The Sickness of Pregnancy presented itself in Cases 83 and 98, in the first as a subordinate malady, in the second as the principal one ; in both the Spinal Ice-bag was wonderfully remedial, and, in Case 98, it recovered the reason and, in all probability, saved the life of the patient. This terrible malady, incomparably more prevalent, and far more serious, because far more prolonged, than sea-sickness, was like it, confessedly uncontrollable by medical art until the date (1863) when I demonstrated its curability by means of the Spinal Ice-bag. Since then several severe cases have been under my care (I have only been consulted in severe cases), and *in every case* the Neuro-dynamic treatment has proved successful.

Diarrhœa occurred in Cases 60, 69, 81, 86, 90, 96, and 99, and each of these cases presented peculiar features deserving special attention. In Case 60 the disorder recurred monthly as a prelude and accompaniment of the catamenia. Associated with the diarrhœa were pains in the abdomen so severe as, according to the patient's phrase, nearly to draw her double. In Case 69 the disease occurred more or less throughout each catamenial period. In Case 81, the patient, a musician, had been long accustomed to feel, whenever he was going to give a concert or to perform in public, a sort of apprehension affecting his bowels, and causing him to have a markedly loose stool about five minutes

before the concert began. An endeavour to let the bowels act half-an-hour before was of no avail as a preventitive of the inconvenience complained of. In Case 86 the disease, which had lasted three months when I first saw the patient, troubled her both night and day : in the daytime the bowels were moved almost immediately after the patient took any food or drink, so that she was almost afraid to take anything, "because it brought it on ; " it also came on about midnight every night after she had been in bed about two hours, during which she generally slept. In Case 90 the patient was attacked by diarrhœa each night about midnight, when the disease became very severe, and then gradually lessened towards morning : the bowels were moved eight or nine times each twenty-four hours. In Case 96 the patient, sixteen years old, had been afflicted with diarrhœa ever since his infancy : it was a common experience for the boy's bowels to be moved nine or ten times during the day, and several times during the night—the food often seeming to pass in an undigested state. Both the patient and his mother declared that the longest period that they could recollect him to have remained free from diarrhœa was five days at a time, "and then," his mother added, "it was when he was taking diarrhœa mixture." In Case 99 the patient had been suffering from diarrhœa almost incessantly during five months, when I was consulted, and had long been peculiarly prone to the disorder. Of course, as in each of these cases of this troublesome malady it had been unusually prolonged and intractable, I was not consulted until all the resources of the medical practitioners attending the patients had been tried and found of no avail. And yet in all these cases a complete cure was speedily effected by the Neuro-dynamic method of treatment, the success of which is still more fully exemplified in my reports of "Cases of Diarrhœa and Cholera," published in 1871.

Flatulency is exemplified in Cases 3, 59, and 85. Indeed, it is so common an accompaniment of disorders of the nervous system, that it doubtless occurred in many other of the cases given in this volume, though I do not appear to have recorded its presence. Cases 3 and 85 were well deserving of the expressive epithet—drum-belly. That in these and in like cases the flatus is not produced by chemical decomposition of the ingesta, but that it is formed from the blood, and effused by the mucous membrane by the morbidly excessive operation of nerve force, is, in my opinion, provable by facts and arguments which cannot be gainsaid. If so we must suppose it probable, *à priori*, that the disorder will be treated most successfully by suitably modifying the condition of the nervous system ; and experience, as reported in Cases 3 and 85, as well as in many other cases of the disorder which I have treated, proves the supposition to be well founded.

At page 83 I promised to give a special Chapter on Flatulency in this volume, and, in fact, the Chapter is written; but finding that were I to fulfil my promise I should swell the present work so much beyond the limits within which I wished to confine it, I have resolved to publish the Chapter in question as a separate essay.

Constipation was a symptom in Cases 7, 10, 13, 20, 22, 29, 30, 39, 40, 49, 53, 59, 87, 88, 91, 92, 95. In all these cases, except those numbered respectively 30, 39, and 59, it is shown in the reports that the constipation was overcome by the Neuro-dynamic treatment; and, though in the three cases last named the improvement in the action of the bowels is not reported, the general restoration of health which was effected leads me to believe that the function of the bowels became normal. The doctrine that by one and the same method of treatment diseases so opposite in character, as diarrhœa on the one hand, and constipation on the other, may be most thoroughly cured seems paradoxical, and yet in reality it is not so. In cases of diarrhœa the nervous centres, which innervate the mucous lining and muscular coat of the intestines, are chiefly involved in tumultuous excitement, hence the exuberant out-pouring from the mucous membrane, and the violent action of the vermicular muscles of the tube. In cases of constipation, which is generally a chronic malady, the intestine is insufficiently nourished, owing to an excessively energetic action of its vaso-motor nerve centres. As by that excessive action its blood-vessels are unduly contracted it receives an insufficient supply of blood; the consequence is, both its mucous membrane and its muscular coat are inadequately nourished. In fact, the muscular coat is in many cases so enfeebled as to become all but paralysed from sheer want of nourishment. Assuming the correctness of this explanation, it is evident that a sedative influence exerted on the nervous centres concerned in the production of both diarrhœa and constipation, seems likely, *à priori*, to prove curative of both diseases, as indeed experience shows that it does; but in cases of diarrhœa the nervous centres which are chiefly disordered are, I apprehend, more immediately spinal—more directly connected with the brain than are those which are chiefly disordered in cases of chronic constipation, and which are more exclusively sympathetic—vaso-motor, in fact—and thus secluded as far as possible from cerebral, or emotional influences.

Deficient Menstruation.—The great prevalence of this disorder is decisively attested by the fact that it was present in about a fourth of the whole hundred cases here given as cases in which pain was a prominent symptom, although several of the patients whose cases are here reported were of the male sex. The disorder occurred in Cases 1, 6, 7, 9, 22, 25, 29, 31, 33, 41, 42, 45, 47, 49, 50, 54, 60, 63, 64,

69, and 84 ; and in all these cases, except 42 and 45, the catamenia were increased in quantity, and, in several of the cases in which there was scope for improvement, it was also improved in quality. Even in the two excepted cases an improvement was effected : in Case 42 the pain and giddiness incidental to menstruation were abolished, and it is more than probable that had the treatment been prolonged, the flow would have been decidedly increased ; and the same remarks apply to Case 45. The aggregate result here described is surely very remarkable, and the more experience of the diseases peculiar to women is possessed by anyone who considers this result, the more readily will he acknowledge that it is without parallel in the therapeutical history of the malady in question.

Retarded and Excessive Menstruation are exemplified in Cases 3 and 66. In Case 3 the patient had often passed seven and eight weeks without menstruating, and then again she suffered from profuse menorrhagia. In Case 66 the patient had menstruated every sixth or seventh week profusely, and had continued to do so during several years. Both these patients became, under the influence of the Neuro-dynamic treatment, quite "regular" in respect to both time and quantity.

Retarded and Scanty Menstruation.—In Case 37 the patient went from six to ten weeks without the recurrence of the catamenia, which were especially scanty : although she was under treatment only six weeks, the flow was rendered decidedly more copious ; whether or not it was accelerated, she was not under treatment long enough to show. In Case 44 the menses had been completely suppressed during three months, when she came under my care, Oct. 24, 1868 : on the 30th she began to menstruate, and continued to do so till the end of Nov. 2nd. This effect was wrought by the Spinal Ice-bag alone ; I had previously treated her with aloes and arsenic in succession without benefit. In Case 68 the patient had not menstruated for three months when she consulted me, Feb. 4, 1871, and before the menses were wholly suppressed, they had always been especially scanty, and very painful. The function was restored May 19th, the flow being free, of good colour, lasting three days, and painless. During the first three weeks of May this patient, besides using the Lumbar Ice-bag, took pilulæ aloes et ferri, gr. v., omni nocte. But the most remarkable case of this kind of which I have had experience is Case 67. In that case the menses had been completely suppressed during eleven years ; they were, nevertheless, restored —have recurred with increasing frequency, until at length they have done so monthly. This patient had previously had the help of several physicians, and I do not hesitate to affirm that this restoration was effected solely, and could only have been effected by the Neuro-dynamic method.

Intermittent Menstruation, of which I have seen and cured several cases, was a notable feature in Cases 13 and 25, in which the menstrual flow and menstrual pain alternated with each other, and in which, while the pain was abolished, the flow was rendered continuous.

Leucorrhœa was experienced in Cases 3, 7, 25, 31, 37, 39, 42, 53, 54, 60, 62, 63, 64, 65, 66, 68, 69, 76, 80, 83, 84, 85, 91, and 97. Of the twenty-four cases here given there were thirteen in which the leucorrhœal discharge was stopped completely. In nearly all the remaining cases it was so nearly stopped that, practically speaking, the patients considered them cured; and in all of them the great improvement effected gave a reliable promise that by continuing the treatment a little longer a complete cure might have been effected in every case. As an example of what the Neuro-dynamic method can do in this disorder, Case 65 is deserving of special attention. The patient had suffered from it during many years: the discharge was so profuse that it saturated her stockings, and often compelled her even to change her boots; and yet by the use of the Spinal Ice-bag alone she was quickly and thoroughly cured! The grounds of strong commendation of Neuro-dynamic therapeutics in cases of leucorrhœa are threefold: 1st, the treatment effects a healthy change in the nervous system, disorder of which is the proximate cause of the disease, and hence it removes the cause; 2nd, this treatment dispenses altogether with the necessity of the disagreeable process—injections into the vagina; and, 3rd, it is pre-eminently successful.

Prolapsus Uteri.—In Case 3 the patient suffered so severely from this disease that, in fact, the womb often protruded "quite out" of the vaginal orifice—generally after she had used any extra physical exertion. In Case 25 the patient was habitually troubled with "bearing down of the womb." In Case 29 the report says,—the patient "suffered from *prolapsus uteri*, on account of which she began to have medical advice two years before" she consulted me. In Case 65 the patient suffered from "habitual *prolapsus uteri*—the mouth of the womb often protruding through the os vaginæ." In Case 80 the patient had a constant sense of bearing down of the womb: "when I walk," she said, "I feel as if it were all open—so peculiar; when it's worst my cough is very violent." In each of these cases a complete cure was effected, without the aid of drugs, without the use of pessaries, and indeed without any appliance to the womb itself, by the simple, but thoroughly scientific, expedient of strengthening the whole of the pelvic viscera by increasing their supply of blood, and therefore of nutrition—a process easily accomplished by the Neuro-dynamic method. Surely, the cures here recorded of the extremely distressing malady in question—

a malady hitherto incurable—should be sufficient of themselves alone to constrain professional study of Neuro-dynamic medicine, which, however, seems likely to be practically appreciated by the people long before any, but a few isolated physicians here and there, have condescended even to examine it.

Excessively Frequent Micturition.—The necessity of "making water" with extreme frequency is an especially prevalent disorder, indeed, even medical art has hitherto been powerless to remedy ; which, however, the etiology of the malady, like several others now passed in review, has not hitherto been understood. This disease is simply a result and expression of excessive reflex activity of those excito-motor nerve centres in the spinal cord which are functionally related to the bladder. Being so, the disease cannot be cured by efforts directed to the bladder itself; but how easily a cure can be effected by the sedative influence of cold applied over the spinal cord is decisively demonstrated by the experience recorded in the reports of Cases 7, 25, 29, 30, 37, 38, 42, 43, 52, 56, 70, and 78.

Albuminuria, with Anasarca.—The rapid abolition of these symptoms, which presented themselves in Case 92, and which were no doubt due to acute inflammation of the kidneys, is especially remarkable and interesting. Feb. 21, 1872, the scalp, face, hypogastric region, and the legs and feet were swollen—the latter being generally so, and also œdematous ; and the urine was loaded with albumen. Feb. 26, after treatment during five days the swelling had almost subsided, and the amount of albumen in the urine was strikingly lessened. By March 4th the dropsy had quite disappeared, and the amount of albumen in the urine had become extremely slight ; and on March 18th, there being no trace of albumen in the urine, and all other symptoms having vanished, the patient was dismissed cured.

By reference to the report of this case it will be seen that, besides the Spinal Ice-bag, drugs and the Turkish bath were also used in the treatment of it ; and I shall not attempt to determine to what extent they contributed to effect the cure ; but as an aid to the judgment of my readers I may mention that I have cured a case of albuminuria, which had existed a considerable time, by the Neuro-dynamic method alone.

Diabetes Mellitus.—Cases 8 and 15 exemplify the successful treatment of this formidable disease by the Neuro-dynamic method. In Case 8 the patient, during the period of treatment, took no medicine, and had the ordinary diet of Guy's Hospital—neither saccharine nor farinaceous matters being withheld. Nevertheless, during the period of treatment, extending over only six weeks, the amount of urine voided daily was gradually reduced from eighteen to seven pints, the general health of the patient being

correspondingly improved meanwhile. Unfortunately he felt himself so thoroughly recovered, that at the end of the six weeks of treatment he insisted on leaving the hospital, and was lost sight of.

Case 15 exhibits results less striking, perhaps, than those of Case 8, but not less satisfactory ; and as attesting the power of the Neuro-dynamic method in the treatment of this disease, I may mention that in a case confided to me by Dr. Goolden, at St. Thomas's Hospital, after the patient had been treated during a considerable period by means of the Turkish bath, I succeeded in reducing the amount of urine voided daily from five pints to four, and its specific gravity from 1030 to 1022 ; also, that in a case in my private practice which had been previously treated by the celebrated Ricord, I effected a complete cure of the disease : in that case the rapidity with which the cure was effected was no less astonishing than was the fact of the cure itself.

Coldness of the Extremities was a prominent symptom in Cases 1, 8, 9, 10, 15, 22, 24, 25, 27, 28, 29, 30, 31, 33, 39, 40, 42, 43, 45, 47, 50, 56, 58, 60, 61, 63, 64, 68, 74, 81, 84, 91, 95, 96, 97.

Coldness of the general surface of the Body is exemplified by Cases 4, 52, 86, 90, 95.

These cases prove in the most decisive and striking manner that the peripheral circulation can be powerfully and beneficially influenced, without acting in any way directly on the surface of the body, by the simple expedient of modifying the temperature along the spine. I refrain from referring more particularly here to the evidence which these supply of the truth in question because in Chapter XV. I have already, for another purpose, adduced that evidence in detail.

Tenderness along the Spine was observable in Cases 32, 35, 36, 37, 43, 51, 58, 66, 72, 73, 76, 78, 80, 86, 90, and 97. The fact that this symptom is reported to have obtained in this large proportion of the whole hundred cases in question affords considerable corroboration of the general doctrine insisted on throughout this volume that the various diseases now passed in rapid review are all, essentially and fundamentally, diseases of the nervous system. It is probable that a considerably larger proportion of the hundred cases would have exhibited this tenderness if all of them had been examined : what proportion of them were not examined I am, however, unfortunately unable to say. As spinal tenderness was not usually a symptom *complained of*, and as it usually becomes undiscoverable when the morbid phenomena in different parts of the body with which it is associated are no longer observable, I have not, as a rule, kept any record of its disappearance along with these phenomena. Its existence, however, is none the less interesting and instructive.

The Correlations of Different Diseases.—On this subject a very important and a very instructive chapter might, and, indeed, no doubt will, be written ; but here I must crowd what I have to say upon it into two or three pages. If, as intimated in the preceding paragraph, the diseases now passed in review are all phenomena of disease of the nervous system, it is manifest that, as they arise out of a common ground, they must be fundamentally related, and that given any particular disease which is a phenomenon of a morbid affection of some particular part of the spinal cord, or of some particular ganglionic centre, the development of other diseases which are phenomena of a morbid affection of neighbouring parts of the spinal cord, or of neighbouring ganglionic centres, may be predicted with the certainty that in a large proportion of cases, at least, the prediction will prove true. And, conversely, it may be predicted with equal certitude that a method of treatment which proves curative of one of a group of such correlated maladies will prove curative of its correlatives also.

Some time ago I was consulted by a lady, who informed me that she is liable to hæmorrhoids, and that she is especially troubled with them at or about her catamenial periods. In fact, in her opinion, which she volunteered to me, the two discharges produce each other : whichever begins first, the other is pretty sure to follow. Another of my patients, who used to be liable to pulmonary hæmorrhage, was especially prone to it during her catamenial periods, or immediately afterwards. In both these cases the catamenia were unduly copious. In a third case under my care, and the particulars of which were published in the *Medical Mirror*, the patient had suffered from profuse and often recurring hæmorrhage from the bowels during upwards of twenty years, and yet she menstruated regularly and abundantly. It is evident therefore that the hæmorrhoids in the first case, the pulmonary hæmorrhage in the second, and enteric hæmorrhage in the third, cannot have been vicarious of the catamenia, although in the first and in the second case the morbid discharge was especially liable to occur in connection with the catamenial period. I regret that in the third case I did not give special attention to this point, and therefore did not learn from the patient whether she was especially liable to the attacks of enteric hæmorrhage at her menstrual periods. After my attention had been arrested by these cases, I began to look out for similar cases, and I have found that they are by no means rare : in the present year (1872) two cases of this kind came before me in one afternoon. One of them was a case of pulmonary, the other of enteric, hæmorrhage, associated with the catamenia.

Now, as these hæmorrhages were not vicarious of the catamenia,

and, as in the first and second case, they came on most especially at the catamenial periods, the interesting question arises,—why, in these two cases, was the hæmorrhagic tendency especially strong during the catamenial periods? I have reflected much on this problem, which I have never seen adverted to by any medical writer, and which therefore, so far as I know, has never been explained. The following explanation, if not the true one, will perhaps seem worthy at least of provisional acceptance, and will, at all events, serve, I believe, as a valuable guide to treatment in cases like those in question.

I must premise, in accordance with the doctrine expressed in the first paragraph of this section, that, as a general rule, when any special condition of the circulation of the blood in any part of the body occurs—any grade of anæmia, hyperæmia, or congestion, for example—there is a tendency in the organism to extend that condition to adjoining or surrounding parts, the parts immediately contiguous partaking of that condition most completely, and those more remote less so in proportion to their distance. Thus, for example, that form of local hyperæmia and ultimate inflammation known as a common boil, is characterised by a gradual diffusion of the morbid condition throughout the surrounding parts—that condition becoming less and less marked in the parts increasingly remote from the centre of inflammation, until at length it is no longer perceptible. Now, such I hold to be the case in respect to the nervous, as well as in respect to all other vascular, structures. Assuming that it is so, and I presume no one will deny the correctness of this assumption, we have, I think, in this fact rightly interpreted the explanation of the tendency to simultaneousness of the discharges in question.

The phenomena of menstruation, if not actually of nervous origin, are certainly very intimately connected with the functional activity of the nervous system. During the times between each catamenial period the ganglionic nervous centres, functionally related to the womb, are acting with that amount of energy which is necessary to maintain the uterine arteries in their ordinary state of constringency—a state which allows of the withdrawal from them of the amount of blood requisite for the nourishment of the organ. But at length that energy is overbalanced: the positive motor nerve centres (trophic and secretory) related to the reproductive organs enter on their periodical phase of excitement, and transmit a correspondingly great amount of force to every part of the ovaries and womb. Each part thus rendered, as it were, powerfully electric is enabled to attract, through the arteries which supply it, a larger amount of blood than before, and, as all the parts are thus acted on simultaneously, there is a general enlargement and turgescence of the organs. The swelling of the ovaries attains its maximum when they extrude the ova

into the fimbriated extremities of the Fallopian tubes; but the swelling of the womb, and the sanguineous tide flooding every part of it, begin to subside only when, after distending to the uttermost the delicate capillary vessels of the uterine mucous membrane, the blood oozes through their exquisitely thin walls, and escaping into the uterine cavity constitutes, along with the modified product of the glandlets of that membrane, the menstrual flux. Gradually the cerebro-spinal, or positive motor, force which, temporarily over-balancing the sympathetic or negative motor, produces these tumultuous phenomena, declines again, and the quiescent life of the organs, due to the equipoise of these two forces, is resumed. Now, when the cerebro-spinal centres in question enter on their monthly, or at least periodical, state of hyperæmia, excitement, and predominance over their corresponding sympathetic centres, the temporarily hyperæmic condition of the former is generally extended more or less to proximate centres. If, however, certain centres in the spinal cord, though less near to those primarily affected as described, are from any cause more susceptible to disturbing influences, they will tell even more distinctly of those influences than will those centres which are actually the nearest to the focus of disturbance; for example, the fact of the intimate functional and sympathetic relation between the positive motor nerves of the uterus and those of the mammæ explains the commonly observed swelling of the latter as a prelude and accompaniment of menstruation. Whenever the peculiar vascular condition of any given nervous centre is propagated to others, the circulation of the blood in the peripheral parts to which those centres are functionally related will be correspondingly disturbed, and if the peripheral blood-vessels of those parts—the mucous membrane of the bowels or of the bronchial tubes, for example—be in any given case especially feeble, hæmorrhage from them is likely to occur, and often does occur. The trophic nerve-centres of the enteric mucous membrane are closely contiguous to those of the womb; and those of the pulmonary mucous membrane are closely contiguous to those of the mammæ: from these facts I deduce the probability and explain the occurrence of enteric and pulmonary hæmorrhage as occasional concomitants of menstruation.

Holding this hypothesis respecting the origin of simultaneous hæmorrhages in such cases as those I have mentioned, I have been led to treat them by stimulation of the vaso-motor (negative motor) nerve centres. This I do by the application of heat on each side of the appropriate part of the spine by means of the Spinal Water-bag, and with very satisfactory results. And so far from regarding such hæmorrhages in any sense vicarious, I do not hesitate even to put an end, for a time, to the menstrual flow itself by means of heat, if doing so should prove a necessary condition of arresting the simultaneous bleeding from the bowel.

CHAPTER XVI.

NEURO-DYNAMIC MEDICINE EXEMPLIFIED: A SERIES OF CASES ILLUSTRATING ITS PRINCIPLES AND PRACTICE.

CASE 1.—*Mammary, Ovarian, and Uterine Neuralgia; Headache; Singing in the Ears; Little Fits.*

Mary H., aged seventeen, whom I saw for the first time 24th February, 1863, was troubled with frequently recurring pain in the right breast. She had had this pain, she said, as long as she could remember; the right breast was considerably larger than the left. She also complained of very severe pains in the left ovary, which were increasingly acute immediately before the recurrence of the menses. Pressure over the painful region caused great suffering. Menstruation, which only lasted a day, and which was preluded by headache and general feverishness, was accompanied with "fearful cutting pain" in the womb. She suffered almost constantly from headache and singing in the ears. In her fourteenth year she began to have epileptic fits, and had long been troubled, when I first saw her, with little fits every day, chiefly in the morning and evening. Her feet were habitually cold; her hands generally so. She had a sallow complexion, and was depressed and melancholy.

She had been an out-patient at the Soho Hospital for Women during two years; then at the Middlesex Hospital upwards of a year; and, finally, at the National Hospital for the Paralyzed and Epileptic about nine months: during the whole of this time she derived no substantial benefit from the treatment she underwent.

I treated her by the Neuro-dynamic method; I also prescribed the use of flannel drawers and armlets, abundant physical exercise, and the use of aperient pills if the bowels should be constipated.

The little fits and the singing in the ears ceased entirely in the month of March, or within a month from the time the treatment began. In May the mammary and ovarian neuralgia had also quite ceased; and the catamenia, which had increased on each occasion after the patient came under my care, and which already

continued nearly a week, were preceded by no distress, and were accompanied by no pain whatever. Her feet and hands had become continuously warm. She had headache very rarely, and when it did occur it was very slight. Her complexion had become much brighter, and her expression much more cheerful.

The treatment was continued pretty regularly until the end of July, when the difference in the size of the two mammæ was scarcely discernible. After this date the Spinal Ice-bag was applied irregularly, and much less frequently, and on the 25th of August was discontinued entirely. The mammæ then appeared to be quite equal. I saw the 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 saw this patient on several occasions long afterwards, and she assured me that the troubles on account of which she consulted me had never recurred.

Case 2.—*Uterine Neuralgia.*

Mrs. B., a paralytic, who consulted me April 29, 1863, complained of "dreadful pain down the back, and over both hips," throughout nearly the whole of each of her menstrual periods ; it was most severe, however, during the first three days. She did not begin to menstruate until she was eighteen years old ; but the flow, she said, was fairly copious. Cold was applied along her spine, in one way or another, during the whole of the following May and June ; and when the catamenia recurred on the second occasion after the treatment began, they were preceded by no pain whatever ; she had "very trifling pain" restricted to the back during the first two days, and afterwards no pain at all.

Case 3.—*Severe Backache ; "Drawing-down Pain" in the Pelvis ; Cutting-pain in the Womb ; Continuous Headache ; Dimness of Sight ; Swelling of the Abdomen, Legs, and Feet ; Extreme Prolapsus Uteri ; Irregular Menstruation ; Menorrhagia ; Profuse Leucorrhœa.*

June 7, 1863, Mrs. M., aged thirty-five, consulted me on account of her manifold sufferings. Her backache, dragging pain in the pelvis, and what she called "a sort of cutting pain" in the womb were incessant. She had headache all day every day. Her sight was so feeble and dim that she

could not tell the time by the church clock, which was close to her house; and one object often appeared to her, she said, as several. Her abdomen, legs, and feet were habitually swollen, and she suffered terribly from *prolapsus uteri* and leucorrhœa, which came on simultaneously soon after the birth of her first child, seven years previously. She had had three children; and, after the birth of each, both these disorders seemed to increase. The womb had often protruded "quite out" of the vaginal orifice—generally after she had used any extra physical exertion. She had many times passed seven or eight weeks without menstruating, the leucorrhœa being much increased. She had also suffered from profuse menorrhagia—what she called "flooding"—on several occasions. Her countenance was depressed; she had a sallow complexion, and her appetite was very feeble. She complained of great and general weakness: she felt as if she must drop down, and had fallen "many a time."

She was treated solely by means of the Spinal Ice-bag.

On the 25th of June—less than three weeks after the treatment began—the patient reported a great improvement: her backache had lessened; she rarely had headache; the "cutting pain" in the womb had ceased; her vision had become quite clear and normal; the abdominal swelling had nearly subsided; the womb came down much less both in extent and frequency; she felt altogether much stronger; her appetite had become vigorous; and her complexion and expression had immensely improved.

Early in July she menstruated freely; after the menses had ceased the leucorrhœa did not recur. The swelling of the feet as well as of the abdomen subsided entirely, and all her other troublesome symptoms wholly disappeared. I saw her on the 18th of the following November, when she assured me that since the early part of July she had not been troubled with any white discharge, prolapsus of the womb, 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 had continued to menstruate at the normal intervals, and that in all respects she was quite well.

Comment.—This case will always be invested with peculiar interest because it was the first one in which experimental proof was obtained of the truth of the doctrine insisted on in my writings, viz., that prolapsus uteri and leucorrhœa are most effectually and most certainly, as well as most agreeably, curable by lowering the temperature of those segments of the spinal cord, and of those sympathetic centres functionally related to the morbidly affected parts.

CASE 4.—*Cramps of the Lower Extremities; Clonic Spasms of the Muscles of the Lower Jaw; Cervical Neuralgia; Dimness of Sight; Subjective Spectra; Distressing Coldness of the Surface of the Body generally, and especially of the Feet.*

Mrs. E., aged sixty, consulted me June 11, 1863, when she complained of extremely painful cramps in the thighs and legs—so painful that she never passed a night without getting up at least twice to relieve herself by rubbing them. She also complained of a peculiar and involuntary closure of the lower jaw, sometimes so violently as to wound her lip. This spasmodic affection of the muscles of the jaw had been experienced several times a day during the three weeks before I saw her. She was also troubled with an "aching pain" at the top of the neck during the night. Her sight was often dim, and frequently she was much afflicted in the night by the vision of a very bright light—"brighter than any Bude light I ever saw," she said, and with an inexplicable "feeling of thorough terror and distress," which frequently compelled her to get out of bed and pray to be relieved of it. She complained of excessive lassitude and sleepiness in the day time; she slept very little at night, and even when disposed to sleep was prevented from doing so by the cramps in her limbs. She had become thinner than formerly, had a very feeble appetite, and although warmly clothed, suffered extraordinarily from cold. Her feet were habitually and extremely cold. There was decided tenderness of the spine between the scapulæ.

She had "always been a crampy subject." For more than twenty years she had always been cold to the touch, she said, even over the shoulders and bosom, in spite of being well clothed. Two years before she consulted me she suffered from neuralgia in the ball of the eye; since then frequently from neuralgia in the face, which on the last occasion continued two months, and ceased about a fortnight before I saw her.

She was treated by means of the Spinal Ice-bag. I also prescribed the following medicines:—

℞ Hydrargyri chloridi, gr. j.; Ext. colocynthidis, gr. ii½; Ext. hyoscyami, gr. i½; M. ft. pilula alternis noctibus sumenda.

℞ Infusi calumbæ, ℥j.; Ferri et quinæ citratis, gr. vii., bis die.

At the end of the first week of treatment she reported that she had scarcely any cramps at all; that the feet had become constantly warm—warmer than she had ever felt them in her life; that the involuntary closure of the jaw and the pain at the top

of the neck had ceased; that her vision had become much clearer; that she had not once seen the "Bude light;" and that all her feelings of mental distress in the night had gone.

The patient continued the use of the Spinal Ice-bag as prescribed, but without taking any medicine after the first week, until July 8th, and after the cessation of the treatment she continued, with the exception of an attack of diarrhœa, perfectly well, and wonderfully warm all over. She was 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, July 15th, simply to show herself in evidence of the efficacy of the Spinal Ice-bag 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 which the treatment continued, and the length of time the surface of the body had continued warm since it was left off, the result is astonishing. The skin was healthily moist as well as warm, and the patient was quite sure that she saw "very much clearer indeed" than she did before the treatment began.

CASE 5.—*Headache; Talking while Asleep; Backache; Neuralgia of the Right Thigh and Knee; Cramps in the Hands and Feet; Spasmodic Contraction of the Muscles of the Hands and Feet; Unequal Development of the Mammæ attended by Pain in the left one.*

M. R. J., a girl, aged thirteen, whom I saw for the first time June 15, 1863, complained of headache, which came on when she rose in the morning and lasted nearly half the day about four days out of seven. The pain was chiefly in the temples. She had very disturbed, restless nights, often started, and habitually talked "nonsense," her mother said, in her sleep. She also often suffered great pain at the bottom of the back, down the front of the right thigh, and in the right knee. She was frequently troubled with cramps in the hands and feet: they were most severe on the right side, and were increased in the hands when she held small things, especially a pair of scissors. The common extensors of the hands and feet were spasmodically contracted. The left pupil was considerably larger than the right. The feet were habitually cold. Bowels regular. Pulse 96. The patient had been in the habit of walking in her sleep, her eyes being open and quite fixed meanwhile. Her mother formerly suffered from epilepsy, her sister was then afflicted with that

disease, and one of her brothers had "dreadful fits" while cutting his teeth, and had also walked in his sleep.

She was treated by the Neuro-dynamic method, and in addition I prescribed the following medicine :—℞ Potassii iodidi, gr. ij.; ammonii bromidii, gr. iij.; ex aquâ bis die.

The effect of the Spinal Ice-bag was immediate: during the first week of its use her headaches became less frequent, and when they recurred they ceased earlier in the day than formerly; but after the first day of treatment the pain in the back, thigh, and knee, and the cramps in her hands and feet had ceased entirely. The appetite was improved, and the pupils had become nearly equal. During the nights she still continued about as restless as before. At the end of the second week of treatment she became quite free from headache, and both started less, and talked less nonsense, in her sleep. The inequality of the pupils had become so slight as to be almost imperceptible. On July 13th she said she felt quite well in all respects, and her mother reported that she was "merrier and better a great deal;" but her sleep had not yet become healthy, though her restlessness and the amount of "nonsense" she talked in the night had "steadily lessened."

August 4th, her mother said,—"She talks very little nonsense now," and reported that she continued free of all the other symptoms formerly complained of, and that her appetite was "wonderfully improved." At that date, however, she complained 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 Spinal Ice-bag to be used as before, but to be inclined to the right side of the spine between the scapulæ, and the application of heat to the corresponding part on the left side several times a day.

The patient said, September 7th, that the hot water bag was soothing and very agreeable, and that the pain and tenderness of the left breast were lessened; and her mother remarked that the "nonsense" was "all but over." The same treatment was continued until October 13, 1863, when the mammæ, chiefly by the development of the right one, were so nearly equal that the difference between them was scarcely distinguishable. The left one was no longer either hard or painful. The pupils were equal. The patient had passed many nights without talking in her sleep at all; and as in all other respects she was in perfect health, the treatment was discontinued.

CASE 6.—*Uterine Neuralgia; Deficient and Irregular Menstruation; Epilepsy; Partial Dementia.*

Miss C. A., aged twenty-eight, first seen by me June 30th, 1863. She suffered extremely during at least two days immediately before, and during the whole of each menstrual period. Her mother said,—"She is doubled up with pain." She had never been regular as to time or quantity: had often gone two months without being unwell, and during the preceding half year the menses had recurred about every sixth week, and had lasted about three or four days, the discharge being very slight—"often a mere show." She did not begin to menstruate until she was twenty-one. The patient had suffered from epilepsy ever since she was two years old. Her mind was much impaired: she was quite childish, and had long periods of "sulkiness," or semi-stupor, when, as her mother said, she was "sickening for her fits." She never menstruated without having a considerable number of violent fits, which either preluded, accompanied, or closed each period. Her bowels were habitually constipated, and her feet were "always cold." In the hope of deadening her pain at her periods, and of bringing on or increasing the discharge, her mother gave her hot gin-and-water on each occasion.

I requested that the gin-and-water should be entirely omitted, and treated her by means of ice. She was under my care four months, during which 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. On the fifth occasion the menses were copious. Her bowels became open daily without the aid of aperients, and her feet became quite warm, so that, as her mother said, there was "no longer any occasion to put them in hot water." The fits gradually became less in number, much shorter, and less severe; and on the third occasion the patient, for the first time in her life, menstruated without having a single fit.

CASE 7.—*Painful and Deficient Menstruation; almost Continuous Pain of the Right Eye, and Constant Headache; Severe Epilepsy; Habitual Constipation; Excessively Frequent Micturition; and Leucorrhœa.*

W. E., a girl, aged eighteen, who was admitted into St. Thomas's Hospital, July 30, 1863, suffered intense uterine pain of a "cutting or griping" kind, together with back-

ache, preceding and during the whole of her menstrual period. She could not stand, she said, because the pain was so dreadful. She had "terrible headaches every day, and nearly all day long," and almost continuous pain at the upper part of the ball of the right eye.

She usually had a severe epileptic fit about once a fortnight; but during the three months immediately before she came under my care she had had no large fit. She was afflicted with terrific "shakings," which consisted of sudden and violent jerks, sometimes of her arms, sometimes of her legs, and sometimes of her whole body. They often threw her down as if she were electrified. They seemed to her to proceed "from the waist and head;" she felt many times a week as if she had a tight string round her head; when this seemed to give way she fell down, and then felt as if grasped tightly round the waist. She fell down two or three times a day, but the number of jerks she had without falling was very great. She was most troubled with them early in the mornings, when they often occurred in continuous succession during an hour at a time. They recurred daily, except during the two or three days immediately following that on which she had had a large fit. During her "shakings" she generally retained her consciousness. Often when they were unusually severe her face and body were swollen.

Her vision was impaired: with the right eye she could only read test-type No. 3½, and with the left, test-type No. 2½. She could not distinguish objects or recognise persons at a moderate distance from her. If she read, her eyes became suffused with tears; and on dark or dull days she could scarcely read at all. Both her pupils were remarkably large, and contracted very slightly in the presence of light. She complained that her eyes were gradually getting worse.

Her bowels were usually constipated—often confined three or four days together. She always passed water during her "strong" fits, and habitually with abnormal frequency. The catamenia, which lasted about four days, were very scanty—"poor." She was troubled with habitual leucorrhœa, which was increased by warmth or a violent access of "shakings." She was generally very warm, often flushed, and troubled with what she called "wet-heat;" her back and hands were especially hot.

The patient was a "seven months' child." She had her first fit—a long one—when she was about three years old; she had a second about two years afterwards, and from that time she had usually had a strong fit about once a fortnight. The "shakings" came on about five years before I saw her.

She had been an in-patient of Middlesex Hospital upwards of four months, and out-patient at St. George's Hospital several

months, and also an out-patient at the National Hospital for the Paralysed and Epileptic between two and three years.

My treatment of this patient at St. Thomas's Hospital began August 7th, was continued until the end of October, and was solely by means of the Spinal Ice-bag. The following is a record of the changes which took place :—

Dysmennorrhœal Pain.—She began to menstruate Sept. 11th, and again Oct. 8th. Immediately before, and during each of these periods, she experienced no pain whatever.

Headache.—This gradually lessened, and, Sept. 22nd, finally ceased.

Aching of the Right Eye had quite ceased by the end of August.

Large Fits.—Aug. 12th, 1 ; Sept. 5th, 1 ; Sept. 25th, when ice was not being applied, 1. None afterwards. [On Sept. 19th the ice was ordered to be omitted until the patient should be clothed in flannel ; this having been done, it was resumed. The ice was re-applied Sept. 26th.]

"*Shakings*" *or Jerks.*—Of these the patient had an aggregate of 330 during the twenty-three days of treatment in August ; during the twenty-four of September in which they still continued she had only 230 ; and on Sept. 24th they finally ceased.

State of the Eyes.—Sept. 24th lachrymation had quite ceased ; the pupils were contracted to their normal size ; the eyes felt much stronger, and she could see distant objects much more clearly than formerly. Oct. 22, the pupils continued normally contractile, and the visual power had so improved that at that date she could read test-type No. 1½ with each eye.

The Bowels gradually became increasingly more active, and after Sept. 29th they continued to be opened regularly each day.

Micturition ceased to be abnormally frequent.

Catamenia.—The sanguineous secretion which recurred Sept. 11th was scanty as usual ; but on the 13th and 14th "a great deal of white stuff" was discharged ; and the flow which recurred Oct. 8th was quite healthy in respect to both quality and quantity.

Leucorrhœa.—This ceased entirely after the second menstrual period.

General Health.—Before the patient left the Hospital, Nov. 5th, she had quite lost the feeling of being swollen either in her face or body ; the flushings, as well as the "wet-heats," had ceased to trouble her ; and she expressed herself as feeling in all respects quite well.

CASE 8.—*Cramps and Coldness of the Lower Extremities, associated with Diabetes.*

John Dawson, aged twenty, farm labourer, was admitted into Guy's Hospital, Sept. 3, 1863, nominally under the care of Dr. Owen Reed; but, owing to his absence, Dr. Wilks had, in the first instance, charge of the patient. The patient believed himself to have been quite well seven months previously, when he first noticed an increase in the quantity of his urine. From that time he had gradually become weaker, and had been losing flesh. When admitted into the hospital, he suffered severely from cramps in the legs down to the toes inclusive. His feet, especially when he lay down, were usually cold; the skin of his hand was peculiarly hard and dry; his tongue was beefy-red; his bowels were fairly open; and his pulse was 80 per minute. During the five days he was in the hospital before he was submitted to treatment of any kind, the average quantity of urine voided daily was 18 pints, the specific gravity being on one occasion 1041, and on another 1033; he was extremely thirsty, and had a voracious appetite. Dr. Wilks allowed me to treat the patient by means of the Spinal Ice-bag, which was applied along the whole spine, until the lower extremities had become warm and free from cramps; and afterward it was restricted to the upper half of the spine. The patient had ordinary diet, ate what he liked, and took no medicine. The treatment, which began Sept. 3rd, ended Oct. 19, 1863.

Early in September the cramps ceased entirely, and speedily after their cessation the feet became completely and permanently warm. The patient's skin became soft and moist, and both his hunger and thirst steadily lessened. During the period of treatment the pulse averaged 90 per minute, and the quantity of urine voided daily was as follows:—

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

The specific gravity of the urine averaged during the month of October was 1031.

Simultaneously with the great and rapid diminution in the quantity of urine voided, the patient regained his wonted health and strength, and on Oct. 20, without permission from Dr. Rees or myself, he left the hospital, notwithstanding that the "sister" who attended him urged him to wait till he had seen one of us. He said he was so much better it was useless for him to stay any longer. I never saw him again.

CASE 9.—*Dysmenorrhœal Pain; Deficient Menstruation; Coldness of the Feet; Epilepsy.*

G. A. M., aged twenty-two, came under my care Sept. 29, 1863. She suffered "pinching, drawing pain" during the whole period of menstruation, and generally during one or two days previously. The menses, which recurred regularly, were scanty; the patient's feet were habitually cold; and she had epileptic fits—generally about three each month. She was treated by means of the Spinal Ice-bag, and took the following medicine:—

Ammonii bromidii, potassii bromidii āā, gr. v., in a wine-glassful of water twice a day.

On the 25th of October she began to menstruate: during the first and second day the flow was much more copious than it had been previously, while the pain experienced was very much less than she had usually felt. She reported, Nov. 2, that her feet had become continuously warm, and at that date she had passed six weeks without having a fit. The menses recurred Nov. 29th, and continued about a day longer than they had done formerly. 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; and she had no fit. Always, except on the last three occasions, she had had fits during her catamenial periods. Jan. 5, 1864, I was informed that the menses recurred on Dec. 31. She said,—"I had no pain at all, except a few pains in my stomach," and her period again passed without an epileptic attack. But though she was improved to the extent mentioned, no further progress was made, and the treatment was not continued.

CASE 10.—*Lumbo-abdominal Neuralgia of twenty years duration, associated with Sleeplessness, Nausea, Vomiting, Obstinate Constipation, and Extreme Coldness of the Feet.*

Miss E., aged about forty, complained January 14th, 1865, of extreme pain on the right side of the lower dorsal and upper lumbar

vertebræ, extending laterally on the same side of the back, and thence forward to the right hypogastric region. The pains continued every day and every night, and had lasted about twenty years. Sometimes, however, she had three or four hours' release from suffering. The pain was so distressing and wearing that the patient was greatly weakened, especially by want of sleep, and was disqualified from undertaking any regular occupation. During the previous three months she had not had a night's rest, and had trusted to narcotics for such sleep as she had had. She suffered nearly every morning, and frequently throughout the day, from nausea, and occasionally vomited "water." Her hands and feet were habitually cold, even in summer. The pulse was 94. Her menses recurred every three weeks, and lasted about three days each time; she complained of obstinate constipation—her bowels never being relieved without the aid of medicines. She had been attended by at least five regular practitioners, including an eminent London physician, who treated her during eight months; had also tried homœopathy and mesmerism; had taken considerable doses of quinine; had bathed in salt water, and had been in the habit of wearing, during a long period, a wet bandage round the abdomen.

I prescribed as follows:—Tinct. quinine co., ℥ij., at noon each day. ℞ potassii iodidi, gr. j.; potassii bromidii, ammonii bromidii, āā, gr. v., morning and evening. Apply the two lower cells of the Spinal Ice-bag during 30 minutes before breakfast, and just before going to bed.

When I saw the patient again, on the *4th of February*, the pain "was very much lessened," but she had not yet been a whole day without it. The nausea and vomiting had lessened; her feet had become warmer, and her appetite much better; she had menstruated since her last visit as usual. The patient found no discomfort from the use of the ice; but, on the contrary, she felt the cold pleasant. I ordered the treatment to be continued as before.

17th February.—The pain had increased somewhat again; it came on daily exactly at the same hour (half-past six p.m.), and lasted about two hours; but, on the whole, she was considerably better: she could sleep throughout the night, and had had neither vomiting nor nausea during the last two days; her general health, appetite, and spirits had improved, and a stabbing pain which she felt sometimes at the heart had ceased; the bowels were open every other day without the aid of aperient medicine.

March 3rd.—While using the Spinal Ice-bag as last ordered, her nose bled, and she had such fulness and pain of the head that she felt as if she should go out of her mind. After three days of this experience she reverted to my former prescription in respect to the

use of the bag. The head then became much better, but she still had slight headache and a sense of fulness. The neuralgic pains were so wonderfully better that she was filled with astonishment: she had passed an entire day without pain—an experience she had not had before for twenty years. The sickness was "nearly all gone;" feet very much warmer—in fact, she no longer suffered from cold feet—no more constipation. I prescribed the application of the ice morning and night in the lower and in the upper half of the middle cell, and requested that she should take no medicine.

April 1st.—She had been many days absolutely free of the neuralgic pain. As she remarked, "it might be said to be gone." Nausea and vomiting had quite ceased; bowels "very regular indeed." The Spinal Ice-bag had been left off a few days ago; since then the feet had ceased to be as warm as before, and the appetite and digestion had again become somewhat feeble. I ordered the ice to be reapplied once daily, and the Spinal Water-bag, medium size, temp. 120°, to be applied to the cervical and upper dorsal region each night after getting into bed. I prescribed at the same time the following medicine:—℞ Infusi. calumbæ, ℥j.; Potassæ bicarbonatis, ammonii bromidii, āā, gr. v., bis die.

I did not see this patient again, but I heard more than once from her cousin that she continued well.

Case 11.—*Neuralgia of the Head and Face, with Swelling and Extreme Tenderness of the Painful Parts.*

March 8th, 1865, I was requested to see Mr. T. H., a gentleman about thirty-five years old, who was suffering from neuralgia, chiefly of the right side of the head and face. I found him, at three p.m., in bed. He was in considerable pain, which had been continuous from the previous day, and which had wholly deprived him of sleep. He also complained of headache. The scalp was markedly tender, especially on the right side; the face also; and both were somewhat swollen. During the morning the left side had become invaded. The patient also complained of suffering from cold in the head—a sort of influenza, with considerable aching of both jaws. The head was rather hot; the forehead was slightly moist; the face flushed; the pulse strong and full, 92; the tongue was thinly coated with whitish fur. The malady began about a fortnight previously. During its continuance he had been treated by two physicians. Various medicines were prescribed, amongst them aperients, iodide of potassium, colchicum, cinchona bark, quinine,

and iron. I applied a ten-inch Spinal Water-bag, temperature 130° Fahr., to the cervico-dorsal region, and ordered it to be applied continuously so long as the pain should last. I then left him to write a prescription, promising to see him again before I should leave the house, and ordered quinæ disulphatis, gr. ii.; acidi sulphurici diluti, ℥ x., to be taken four times a day. Within half an hour from the time I applied the bag I returned to him, and found him asleep. The pulse had already fallen to 88.

March 9th, 4 p.m.—I found the patient up, writing a letter. Had had no pain since I saw him the previous day, except little threatenings, which were immediately subdued by the re-application of the Spinal Water-bag. Indeed, it was applied pretty continuously during the whole twenty-four hours. The tenderness and swelling of the scalp and face had subsided; the headache had ceased; and the countenance, no longer flushed, had assumed its natural expression. The patient had slept all night, being only disturbed by the refilling of the bag. He said,—"Once I felt sure a new attack was coming on, and I began to fear another bad night; the bag was refilled and reapplied, and soon I forgot all about my fears by dozing off to sleep. The bag is worth its weight in gold." The tongue was covered with a thick white fur; no appetite; bowels open twice; pulse (after dinner) 84; this morning it varied from 70 to 75. The patient was requested to apply the Water-bag when going to bed as before; on other occasions only if the pain should recur; to apply the two lower cells of the Spinal Ice-bag during thirty minutes three times a day; to avoid wine; and to omit one of the doses of quinine, taking only three in the day.

March 11th.—Had continued free from neuralgic pain. Had only used the Water-bag once—viz., on the night of the 9th, when going to bed. It sent him to sleep immediately; but in about half an hour he awoke with headache, and found his head very cold. His hands, having been beneath the bedclothes, were warm. He removed the bag, and applied one hand to his forehead. The headache speedily ceased. He found the Spinal Ice-bag agreeable, and wished to extend the time of its application. Pulse 72; tongue cleaner; bowels open, but insufficiently so; urine turbid. He was now requested to omit the Spinal Water-bag altogether, unless the neuralgia should occur; also the medicines already prescribed; to apply ice in each cell of the Spinal Ice-bag for forty-five minutes three times a day; to drink water freely; to take an aperient pill occasionally; and quinæ disulphatis, gr. i½; acidi nitro-hydrochlorici diluti, ℥ xv., bis die.

April 8th.—Had had no return of neuralgia, and attended to his business daily; but, though fairly well, he was not in robust

health, being troubled with a little flatulence and indigestion, chiefly due, I believe, to having his sleep frequently broken at night, in consequence of his wife's recent illness. I therefore gladly concurred in their project of going to the sea-side for a time.

I have often seen this patient since : he never had any return of the neuralgia.

This is the first case in which neuralgia of the face and scalp was treated by the application of heat along the cilio-spinal region.

CASE 12.—*Neuralgia of the Chest-walls and Extremities, associated with Sudden Convulsive Jerks.*

June 22, 1865, I was consulted by a nobleman, aged forty-five, on account of neuralgia affecting different parts of the body, the walls of the chest and the lower extremities being chiefly involved. The attacks generally came on suddenly, and usually lasted about fifteen hours, sometimes longer. The pains were of an acute, stabbing, and seemingly spasmodic character, and were often brought on by vigorous muscular exercise, especially deer-stalking, which the patient is very fond of, but which his attacks either cut short or prevented him from indulging in. He also suffered not infrequently from "jerks" or "starts." Though he is not robust, his general health is fairly good. I prescribed the application of the Spinal Ice-bag along the whole spine during three-quarters of an hour twice a day, and ferri et quinæ citratis, gr. v., each day during a few days at a time occasionally. When I saw this patient again, April 27, 1866, he informed me that he applied the Spinal Ice-bag as directed during several weeks at a time, at three successive periods, since he consulted me. He declared himself so greatly improved, that he had been quite free from his malady for long periods together, that when it had recurred, the pains had been comparatively slight, that he could continue violent exercises, including deer-stalking, without bringing on an attack, and that, in his opinion, had he continued the treatment regularly for a longer time he should have been completely cured.

CASE 13.—*Severe Uterine Neuralgia ; Intermittent Menstruation ; Headache ; Insufficient Sleep ; Pain between the Shoulders ; Shortness of Breath ; Cough ; Copious Expectoration ; Frequent Hæmoptysis ; Sickness ; Constipation ; Diarrhœa ; Pain, Weakness, and Coldness of the Lower Extremities ; General Coldness.*

Miss B., aged about thirty, suffering extreme uterine pain

during her menstrual periods consulted me June 26, 1865. Before the flow began the pains came on, and with such terrific severity that, as she said, she was obliged "to dance about the room." This agony usually lasted about five hours. During its continuance the flow stopped completely, and then on the subsidence of the pain recurred. Soon again, however, pain of less intensity was experienced, and again during its presence the flow ceased; and during about five days these subdued pains and the flow, which was scanty alternated with each other until at length they both finally ceased. During the presence of the severe pain she was always purged and sometimes sick. She often suffered from severe headache, chiefly at the vertex, but affecting the eyes, which were very painful, and which felt, she said, as if she could'nt keep them open. The pain was most oppressive in the mornings when she was often obliged to sit a couple of hours doing nothing; usually it cleared away after dinner. Her sleep was generally very much broken and unrefreshing. She had habitually considerable pain between her shoulders, difficulty of breathing, cough, copious expectoration, and frequent hæmoptysis. The surface of the chest was very tender, palpation over the front of it caused decided pain. Her appetite was feeble; during her catamenial intervals her bowels were constipated, and her urine was generally turbid. She suffered from general coldness, but her extremities were especially cold—her feet being the coldest. Her upper extremities were remarkably weak, so that keeping them raised or even raising them cost her an effort. She was also much troubled with what she called "rheumatic pains" in both legs. She began to suffer about six years previously—dysmenorrhœa being among the first of her troubles. I prescribed the application of the Lumbar Ice-bag to the lower part of the spine twice daily, and the following medicines:—Ferri ammonia citratis, gr. viii., bis. die. Olei morrhuæ, ℥j., bis. die.

July 3.—The patient said she was notably refreshed for about an hour after each application of the ice, and became quite warm—both hands and feet—in about five minutes after applying it, but felt cold again between the applications. Pulse, 92. Treatment as before.

July 10.—She reported herself decidedly stronger and better. She said, "the arms don't drop as they did." She complained, however, of a cold in the head and chest—the coughing and spitting being increased. Pulse, 108.

I directed that two teaspoonfuls of cod-liver-oil should be taken at each dose, that the iron and ice should be continued as before, and that she should apply an 8-inch Spinal Water-bag containing water at 115° to the cilio-spinal region each night when going to bed.

July 17.—The cold in the head and chest had subsided, and she had slept better. Pulse, 84. On the 14th, she began to menstruate; the flow began before the pain, and continued along with it; it had never done so before. In fact, the flow was continuous until the 16th, when she had no pain. On the 17th it recurred with very slight pain.

Sept. 12.—The duration of the agonising menstrual pains had now become reduced to two hours, and the pains themselves were decidedly less severe than formerly; she said, "I used to dance with pain, but I can lie down now." Her difficulty of breathing had lessened, she had gained flesh, her feet were always warm, her bowels were open daily, her pulse had fallen to 80, and she kept much better than formerly; she felt altogether better and stronger; she said that after using the ice for half-an-hour she became so uncomfortably warm that she could not bear it to the end of three-quarters of an hour as prescribed.

Sept. 26.—Had still a slight hacking cough, and her chest was still tender to the touch, but the pain between the shoulders was "much better."

Dec. 5.—The catamenia recurred four days ago; she had pain during only a few seconds at a time, "just a few times during the day." The flow continued each day this time. The pains between the shoulders had quite gone, and she had also "lost all those rheumatic pains" which she had had in the legs "for years without anything relieving them." She was still gaining flesh, and her muscles had become much firmer; she slept the whole of each night; she breathed much more easily, and her cough had ceased; she was still troubled, however, with expectoration, which, though much lessened, was "yellow and nasty," and sometimes tinged with blood; she also complained of the flow of "a nasty yellow and palish pink" fluid from her mouth during sleep. Pulse 76, full and regular; tongue clean; urine always clear, though sometimes very pale.

April 7, 1866.—The catamenia continued quite regular, and lasted four days. During the last two periods the flow had been quite normally copious, quite continuous, and without any pain whatever; she had lost her cough entirely for fully two months, but in the latter part of March it recurred with considerable severity and some hæmoptysis.

I continued to see this patient—about once a month—until the middle of 1867; in the beginning of that year she married; she soon became pregnant, and in due time the mother of a "fine boy." In 1868 she called upon me to report herself and to thank me for the benefit she had received from my prolonged treatment of her. Her lungs gradually became healthier and stronger during 1866-67, and on the occasion of her last visit she was able to

assure me that she was enjoying very fair health. She again called upon me (by my request), April 6, 1872, and reported that she had continued tolerably well during the interval since her previous visit; her lungs were still delicate; and she had been troubled at distant intervals with hæmoptysis, especially if distressed mentally, as she had been some months previously by the loss of a child; but on the whole, her health and strength had decidedly increased; she had had three fine healthy-looking children, and with the exception mentioned she was quite free from all the symptoms she originally complained of.

Case 14.—*Intense Pain and Tetanoid Paralysis of the Four Extremities; Diarrhœa.*

A boy, aged two years and four months, was brought to me, April 10, 1866, suffering from rigidity and immobility of the extremities. The arms were stiff, though still partially moveable; the thumbs were forcibly bent within the palms of the hands, and the fingers were drawn over them and fixed in a state of semi-flexion; the legs were extended and rigid, the feet being also firmly fixed as in *talipes equinus*. The child had seemed to become rapidly stout. All four limbs were swollen; the dorsum of each foot so much so as to make the skin tense and glistening. There were also *slight ecchymoses* on the feet. The sensibility was extremely heightened: touching the hands or feet caused the child at once to scream; in fact, he screamed if he saw his feet approached. He also suffered from diarrhœa.

I ordered the application of ice by means of two ten-inch Spinal Ice-bags, one being placed along the spine, and the other across the occiput so as to extend from ear to ear, thus forming an ice-pillow. The applications were continued about two hours, and were repeated in the same manner four times each day, during the early part of the treatment. Afterwards the applications were less frequent. The child was immediately soothed, slept well the following nights, and rapidly became generally calmer and better. On the 12th, the fingers had become more supple; the extremities could be freely handled without causing pain, and the diarrhœa had ceased. By the 25th, he could walk the length of a room, and by the 2nd of May, he was able to walk with perfect ease, and, indeed, had completely recovered, except that there was a slight eversion of the left foot, which subsequently disappeared.

Comment.—The severe inflammatory condition of the spinal cord characteristic of this case is one which, so far as I know, is

incapable of subjugation by any of the ordinary methods of treatment hitherto practised. I regard the swelling and allied symptoms which took place in this child, as an example of preternatural energy due to excessive nutrition of the intensely excited spinal cord.

During about a month previously to the date when the child was brought to me, he had seemed to become generally and rapidly stout; so rapidly, indeed, that the nurse felt concerned in observing this change, although she had no idea that it was a morbid one. As owing to the influence of the ice along the spine the extreme spinal hyperæmia became gradually subdued, the general swelling of the little patient steadily subsided.

It is stated above that "there were also slight ecchymoses on the feet of the child;" these, as well as the petechiæ appearing in various fevers, in some cases of cholera, and of epilepsy, and those together with the larger spots (vibices) so abundant in cases of the disease in question as to give it one of its many names, I regard as results merely of the intense action of those spinal nerves which are related to the elementary cells of the several parts of the organism and which preside over their nutrition. I apprehend that the morbid action of those nerves in these cases is merely an excess of their normal action, and that by this excess they render the elementary cells attractive of blood from the capillary system in greater quantities than they can assimilate, and thus occasion its effusion in spots, the number and size of which are probably proportionate to the vehemence, *within a given time*, of the activity of the nervous force concentrated at the several points where it thus manifests itself. Whether in addition to its action in this way, it also, by its preternatural power, effects a morbid chemical change in the blood immediately acted upon, is an exceedingly interesting question which, however, I think science will probably answer hereafter in the negative. But in any case assuming the reality of the cause here alleged, it follows inevitably that these sanguineous spots indicate no less decisively than do the symptoms already passed in review, the wisdom of applying ice along the spine.

Case 15.—*Persistent Pain in the Loins, associated with Diabetes.*

C. O., aged twenty-six, a carman, was sent to me by Dr. C. R. Drysdale, January 27, 1867. During the previous three or four months the patient had suffered almost constant and increasing severe pain *across* the lumbar region; stooping distressed him especially; he also suffered occasionally from headache; his skin

was dry and rough, and the back of the left hand was nearly covered by a large circular patch of diseased skin which was thickened into an elevated dry crust of a dark brown or reddish colour; his tongue was red, denuded of epithelium, sore, and covered with mucus; he was voiding about four and three-quarter pints of urine daily—urination occurring about every two hours; the urine contained sugar, and had a specific gravity of 1045; the patient's virile power was greatly impaired; his hands and feet were habitually cold—"in the cold weather very cold;" the bowels were prone to be constipated; there was marked tenderness along the lumbar and lower dorsal vertebræ. The patient's attention was not directed to the impairment of his health until the previous June; he then found himself thinner than before, and often troubled with thirst. In August he first noticed that he was passing a great quantity of urine.

The patient was under my observation two years; during the first fifteen months of that period ice was applied to his spine every day, the number and mode of the applications being varied from time to time as having regard to the changes in his symptoms and conditions I judged expedient.

As a full account of this case will be published elsewhere I shall give here only a brief statement of the results achieved by the Neuro-dynamic treatment to which the patient was submitted.

The pain in the loins having gradually and steadily subsided, quite ceased in October, 1867, and never recurred while the patient was under my care.

Headache after recurring with decreasing frequency ceased altogether in May, 1867.

The state of the tongue rapidly improved; in August, 1867, it had become thoroughly healthy both in feeling and appearance, and afterwards continued so.

State of the Skin.—Already by March 10, 1867, the back of the hand had become completely healed; by the end of the same month the skin of the hands had become much softer and moister than before; and in the beginning of June the skin was covered with a gentle perspiration.

Temperature of the Extremities.—By February 9, 1867, the feet had become warm; by May 26, the hands had become warm; and from this date forward a normally vigorous circulation, denoted by permanent warmth, was maintained in the hands and feet.

Thirst which distressed the patient a good deal had already abated considerably at the end of the first week of treatment; at the end of March his thirst was so slight that he thought it had nearly left him, and from that time forward he ceased altogether to be troubled by this symptom.

State of the Bowels.—They gradually became more regular and from the end of March forward they were opened every day.

Virile Power.—This was steadily regained; he reported, July 21, 1867, that it had considerably increased: in September he said he had erections in the mornings once or twice a week; and again, August 30, 1868, he gave a similar report.

Quality and Quantity of the Urine.—The urine remained saccharine throughout the whole period of treatment—the specific gravity generally oscillating between 1045 and 1035; on a few occasions it was as high as 1050, and again as low as 1030. When the patient came to me he was conforming to Dr. Drysdale's prescription, which was as follows:—"To live chiefly on meat, greens, and bran biscuits; to take no stimulants; to refrain from coitus; to take *a great deal of exercise,* and to have a drachm of cod-liver oil three times a day." During the first fortnight while the patient was under my care exactly the same treatment was continued; but to this was added the daily use of the Spinal Ice-bag, and at the end of the fortnight the amount of urine voided daily was reduced from four and three-quarters to three and three-quarters pints. Discontinuing the physical exercise and oil, but continuing the diet and Spinal Ice-bag, the amount of urine voided daily was gradually reduced to two pints and four ounces. Under this treatment persisted in several months the amount of urine voided daily did not exceed this small quantity. And so great was the healing influence that was exerted by the whole course of treatment that six months after it was completely discontinued, and the patient had lived on ordinary diet throughout that time, the amount of urine voided daily did not, as a rule, exceed four pints, no one of the other symptoms returned, and the patient expressed himself as feeling in every respect quite well.

Case 16.—*Infra-Orbital and Dental Neuralgia.*

Fräulein ——, aged twenty-five, consulted me February 3, 1867, on account of neuralgia affecting the infra-orbital and dental branches of the trifacial nerve. The pain was not confined to one side of the face, but was sometimes most acute on one side, sometimes on the other; it increased at night, and kept her awake the greater part of each night. She had been suffering in this way during about three weeks before I saw her. Her general health was good. The affected parts presented no trace of hyperæmia. I directed that the Spinal Ice-bag should be applied close to the occiput and along the cervical and the upper five or six dorsal vertebræ during an hour each night. It was thus applied during a fortnight. The patient experienced almost immediate relief:

after three days of treatment she felt and slept very much better; and before the end of the fifth day the pain had wholly ceased. Nearly a year afterwards she told me it had never returned.

CASE 17.—*Crural and Sciatic Neuralgia of Sixteen Years' Duration.*

I was consulted, June 25, 1867, by Mr. ——, aged forty-nine, who complained of excruciating neuralgia in the legs. The pain was of the ordinary tearing, shooting, and stabbing kind, sometimes in one limb, sometimes in the other, and affecting one heel almost continuously. This was often so acutely tender that he could not bear to touch the ground with it. Occasionally, when the pain was most excessive, the limbs jerked involuntarily. As a rule, the patient suffered most at night, and was thus so habitually deprived of sleep, that he marvelled to find his general health and strength continuing so fairly good as it was. He said that whenever he was able to sleep a little the pain increased. The malady came on about sixteen years ago, and had recurred at intervals ever afterwards. The intervals had gradually shortened, until at last he rarely had an interval of a day without experiencing some decidedly acute and shooting pain. Until the morning he came to me he had never been free of intense pain for nineteen days. On applying considerable pressure on each of the spinous processes, I could discover no tenderness whatever. The brain, lungs, bowels, and bladder were all healthy; the tongue was clean; the pulse 66, and, though rather feeble, steady. The patient was in the habit of drinking daily about a pint of sherry, which I advised him to give up. I prescribed the application of a Spinal Ice-bag along the lumbar and the lower half of the dorsal vertebræ during two hours twice a day (no medicine), and advised abstinence from wine or other alcoholic fluids. The patient did not believe that they exerted any influence on his malady, and was disinclined to give up his wine. He called upon me again July 12th, when he informed me that he had applied the Spinal Ice-bag only once a day on an average; that, "practically speaking," he had had no pain since he began the treatment; that until the day before his visit he had not suffered at all, and then only very slightly from pain below the left knee; and that he had slept well. I repeated my injunctions respecting the use of both the ice and wine, and prescribed potassii bromidii, gr. viij.; ammonii bromidii, gr. v., bis die. I advised perseverance with the ice, and abstinence from wine. The patient wrote to me, August 21st,—"I continue to receive great benefit from the ice application, and shall continue it." The pain afterwards

recurred in a mitigated form, but was greatly subdued by the ice, and, I incline to believe, would not have returned if the patient would have abstained from wine.

Case 18.—*Dental Neuralgia.*

A. W. B., a Russian gentleman, aged thirty, suffering from dental neuralgia, consulted me in September, 1867. The malady was chiefly confined to the teeth of both the upper and lower jaw, but no particular tooth or teeth seemed to be especially affected. The pain was intermittent, and so severe as to interfere seriously with the patient's daily occupation. No cause of the disorder, which had continued some weeks, could be discovered, and the face, so far from showing any sign of hyperæmia over the seat of pain, seemed cooler than normal. I prescribed the application of the Spinal Ice-bag along the upper half of the spine, and close to the occiput, forty-five minutes twice a day. In the course of the first day of treatment the pain was completely subdued; the use of the cold was persisted in for some time, and during the remainder of the patient's stay in England he continued free from suffering.

Case 19.—*Pain and Swelling of the Extremities.*

Sept. 18, 1867, W. G., male, complained of pain in the left hand, and in the right knee and ankle, which were also considerably swollen, as was also the right hand, which, however, was not painful. His tongue was clean, his appetite was good, and his bowels were regular. I prescribed in the first instance the application of ice along the cervical region. On the following day the hand was already much better. I then directed the application once daily of the Spinal Ice-bag along the whole spine till the ice should be melted. By this means the pain and swelling were quickly and completely subdued.

In November of the same year the patient had another similar attack in the right hand and right knee; and again by the use of the Spinal Ice-bag during three days all pain and swelling had vanished.

In January, 1868, I saw the patient again: he had continued at work during nearly the whole of the intervening period. He was much improved in general appearance, and informed me that when threatened at any time with an attack he averted it by using the Spinal Ice-bag.

CASE 20.—*Neuralgia over the Right Shoulder, between the Scapulæ, and along the Right Side of the Chest, together with a Feeling of Fulness and Heaviness of the Head, Headache, and Constipation.*

Mary B., aged fifty-one, first seen by me November 27, 1867. Complained of intense pain over the right shoulder, between the scapulæ, and along the right side of the chest. During the attacks of pain, which came on and went away suddenly, the flesh, she said, quivered and tingled; she felt her body bent down as if she could not move it for fear of the pain. She began to suffer in this way in July, and in November the pain became extremely violent, and what she called a "thick headache," which she said increased whenever she laid her head on the pillow, came on. This increased pain she described as "a double weight, a nasty heavy feeling." Her right leg was somewhat the weakest. She was much distressed too by frequent flushes which came over her. She had menstruated about four times during the two years before I saw her, the last time five months previously, and very slightly. She was treated by the application of the Spinal Ice-bag along the lower half of the spine during an hour twice a day; infusi calumbæ, ℥j., to be taken twice a day, and aperient pills to be used occasionally.

December 4.—This patient reported that after Nov. 28 she felt no pain whatever in the thoracic region, and that on the 29th and 30th she was free from pain of any kind. She said,—"I feel better altogether, and can now stand upright; the weight across the shoulders is gone." The bowels, she added, "have become more regular—without the help of the pills." At the time of her visit she had, however, some pain in the scapula, and the "thick headache," though lessened, had recurred. I requested that the treatment previously prescribed should be continued.

December 18.—She informed me that she was quite free from pain, except in the evening, when fatigued by her work; she looked wonderfully better, and as she said, she "felt much stronger, and not so nervous." She also stated that the "heaviness of the head and the flushes," though not quite gone, had much lessened. Her appetite was good, but her bowels were "still rather obstinate." She remarked that the ice did not distress her in the least, but that during the last fortnight she had only been able, in consequence of her work, to use it during an hour each night. I ordered her to continue doing so.

December 28.—She said she continued free from all neuralgic pain, and that her only trouble then was "heaviness of the head, fulness and headache, as if all the blood went to the head." I

ordered the ice to be restricted to the lower third of the spine, and to be applied during an hour twice a day.

January 15, 1868.—Still had fulness of the head and flushings, but no headache.

January 29.—Reported herself perfectly free from neuralgia, and complained only of rushing of blood to the head, which occurred some twenty times a day. I prescribed the application of ice along the lower two-thirds of the spine during an hour twice a day, and five grains of the pill of aloes and myrrh occasionally.

March 18.—She reported herself quite well, and looked so, even the flushing had almost wholly subsided.

Case 21.—*Infra-orbital and Mental Neuralgia, with Headache.*

F. M., female, aged twenty, consulted me in 1867, when she was suffering from acute facial neuralgia, the chief foci of which were the infra-orbital foramen and the mental foramen of the right side. The extreme pain came on in fits, sometimes at eight a.m., sometimes at two p.m.; but between the paroxysms the face continued to ache, and at times the patient had pain at the back of the head. She had suffered in this way about a fortnight before coming to me, and had had several similar attacks during the preceding year. Judging from the collateral symptoms that this was a case in which the use of heat was indicated, I prescribed the application of the double-columned hot-water-bag along the lower cervical and upper dorsal vertebræ early each morning, before the recurrence of the paroxysm, and at any other part of the day when the pain threatened to come on. The malady was immediately subdued: no distinct paroxysm occurred after the first application of heat; all pain rapidly and completely subsided, and since that date has never returned.

Case 22.—*Uterine Neuralgia; Deficient Menstruation; Dysmenorrhœal Nausea and Vomiting; Leucorrhœa; Headache; Constipation; Coldness of the Extremities; Varicose Veins; Ulceration of the Left Leg.*

Mrs. C., aged twenty-eight, first seen by me December 5th, 1867, suffered from extreme dysmenorrhœal pain during the whole period of menstruation, which lasted only between two and three days, and was very scanty—not more than three napkins being needed during a period. She vomited more or less throughout each period, and suffered much from nausea. During

the catamenial intervals she had leucorrhœa. She was also greatly troubled with headache. Her bowels were very constipated—she often passed three days without action. Her extremities were habitually cold—the legs and feet were excessively cold, and their veins were markedly varicose. A few weeks before I saw her she left St. George's Hospital, where she had been admitted on account of an extensive ulceration over the middle and anterior third of the left leg. While there the wound was nearly healed. When she consulted me it had opened again in the form of several small ulcers of about the diameter of a pea on a dark red or purple ground, having a diameter about equal to that of the top of a tea-cup. I prescribed the systematic use of the Spinal Ice-bag and the following medicines :—Ferri et quinæ citratis, gr. v., bis die ; pilulæ aloes et myrrhœ, gr. v., alternis noctibus.

Experience in this case exemplified in a wonderful manner the efficacy of Neuro-dynamic medicine. The dysmenorrhœal pains ceased entirely ; the menses became normally copious ; the nausea and vomiting which formerly accompanied them were no longer experienced ; the patient became completely freed from headache and leucorrhœa ; the functions of the bowels became normal ; and the extremities thoroughly and permanently warm. But what was especially remarkable in this case was the complete cure which was effected both of the varicose veins and of the considerable ulceration of the left leg. The patient was a laundry maid, for whom, by request of her mistress, I procured admission into St. George's Hospital, where she had the advantage of being treated by Mr. Prescott Hewitt. While there, the wound in the leg lessened so considerably as to become almost, but not quite, completely healed ; and being considered sufficiently well to resume her duties, she was discharged from the hospital. But as she had to stand the whole, or nearly the whole, of each day while at her work, the wound in her leg soon became as large as before, and she suffered at the same time from the other symptoms described above. Her mistress then requested me to treat her, and I did so, while she continued her daily work. The great increase of circulation produced in the lower extremities by the influence of the Spinal Ice-bag effected a *complete cure of the wound in the leg, although the patient was standing on it each day;* whereas with all the advantage of entire rest in a hospital, the treatment usually resorted to in such cases, while effecting great improvement, did not succeed in healing the wound completely, and the benefit conferred lasted only a little longer than the patient's stay in the hospital. But, what was still more surprising and satisfactory, the same "great increase of circulation" induced by the Spinal Ice-bag caused a permanent subsidence and disappearance of the patient's varicose veins.

CASE 23.—*Facial and Infra-mammary Neuralgia; Headache; Persistent Vomiting; Dysmenorrhœa and Coldness of the Feet.*

December 18th, 1867, Frances Schuler, aged twenty-seven, came under my care at the Farringdon Dispensary. She complained of painful pressure at the top of the head, and of acute pain over the forehead and in the right eye. She described the feeling at the top of the head as a "pressure, just like a weight of lead, with great but dull pain."

Both the feeling at the top of the head, and the acute pain over the forehead, and in the right eye, came on in paroxysms. During each attack the forehead swelled very distinctly, and she felt "as if a string at the back and inside her head were drawing her right eye backwards." She shed tears copiously from the same eye. Her sleep was much impaired by her sufferings. She complained also of infra-mammary pain recurring several times a week, and often lasting an hour at a time: sometimes, too, she had lumbar pains for a day together. Both eyes, but especially the right one, had lessened and sunk.

She assured me most positively that since childhood she had vomited every morning in her life, and that her mother and two sisters were affected in like manner. Her vomiting was always increased during her menstrual periods.

Formerly she used to menstruate during seven or eight days, and meanwhile suffered much pain in the back and in the womb; but since she had been liable to neuralgic attacks, her menstrual periods had not exceeded three days, during each of which she had needed only one napkin, which was, she said, very slightly stained. Her feet were habitually very cold. I prescribed the application of ice along the dorso-lumbar region during an hour twice a day.

December 28th.—The patient found that the ice would send her off to sleep at any time: the fourth application caused her to sleep three hours. The first application relieved her head before the bag had been on an hour. After the third application the pain in the forehead ceased; and on the fourth day of treatment she already felt quite well. The pressure and pain at the top of the head, the swelling and pain over the forehead, the pain in the eye, the lachrymation, and the infra-mammary pain, had not recurred; *she had not vomited since the ice was applied the third time.* Her feet had become "nice and warm," and she said that she felt, on the whole, more comfortable than she had been for some years past. Still, after all pain had ceased it came on again at the right side of the back of the head, but was subsiding

at the above date, when I ordered the treatment to be continued.

January 8th, 1868.—The patient stated that she began to menstruate on the 3rd inst., and ceased on the 6th, that the flow was rather more copious, and of a rather brighter colour than previously. She still used only three napkins, which, however, were more saturated than of late they had been wont to be.

February 15th.—The patient had not been very steady with her treatment, and some of the symptoms above mentioned had recurred, but with less intensity than before. She was sick about every other morning; she felt again a weight at the top of the head, but her forehead no longer swelled as it used to do during the previous attacks. She complained of pain at the bottom of the sternum, below the left breast and over the left ovary. To continue the ice as before, and to take Infusi cinchonæ, ℥j., bis die.

March 4th.—The pain, although variable, had not yet gone quite away. However, the patient found herself greatly improved. She began to be unwell on the 1st inst., and was still so: the flow was more copious, and of a better colour. The forehead did not swell any longer. The vomiting, which had tormented her every morning of her life, was stopped: but she had still, at intervals, a feeling of sickness, and I advised her to continue for some time longer the use of the ice, which about a fortnight previously she had ceased to use. I never saw her afterward.

CASE 24.—*Neuralgia of the Right Side of the Head, Face, Neck, and Tongue, and of the Right Upper Extremity, together with Headache, Sickness, and Coldness of the Feet.*

Mary Ann T., aged forty-four, who consulted me for the first time December 28, 1867, was suffering from neuralgia of the right side of the head, face, and neck, and along the right shoulder and arm, extending to the fingers. The right half of the tongue was also affected. The pain, which was exactly limited to the median line, was described by the patient "like as if something is pulling the flesh off the bone—it's so dreadful, and sometimes as if the parts were screwed up in a vice." The most acute pain was just above and outside the outer angle of the right eye. At this part she experienced dreadful twitchings, which came like electric shocks, and made her start fearfully. The focus of pain was much hotter than the surrounding parts; but there was no notable lachrymation. The pain was greatly increased by the local application of cold. Her first attack came on about four years before I saw her; since then she had had four very severe attacks, each in the winter season; but she had had many smaller

attacks generally during the autumn. She had brain fever about twenty years before I saw her, and was a great and habitual sufferer from headache, from which she was scarcely ever free; she had a feeble appetite, was often troubled with sickness, and complained especially of coldness of the feet: she said,—"Oh, they're dreadful, sir! I never know what it is to have them warm now." She continued to menstruate, but very irregularly; she suffered from profuse menorrhagia, accompanied with "very great pain"—was often "unwell" a fortnight together, and during the whole time the menstrual pain continued. Notwithstanding these various disorders, her bowels were opened regularly each day. I ordered the application of ice in a twenty-two inch Spinal Ice-bag along the whole spine during forty-five minutes twice a day.

January 1, 1868.—This patient had applied the ice as directed five times, but complained that it distressed her extremely both in the thorax and abdomen—especially towards the end of each application. The neuralgia had, however, greatly lessened; the tongue was much better, and the dreadful twitchings had quite ceased: she had had no sickness at all. I then ordered the Ice-bag to be wrapped in flannel, and to be applied thirty instead of forty-five minutes each time. The patient immediately and rapidly improved; and, January 15, informed me that she had not had "a bit of neuralgia" during the whole of the preceding week. I saw the patient afterwards, and the pain had not returned.

CASE 25.—*Neuralgia of the Four Extremities, and of the Left Side of the Chest; Backache; Headache; Excessive Irritability of the Bladder; Deficient, Intermittent, and Painful Menstruation; Bearing-down of the Womb; Leucorrhœa; Habitual Coldness of the Feet.*

H. E., aged thirty-two, a very intelligent woman, consulted me on January 4, 1868, at the Farringdon Dispensary, on account of great pains in all the four limbs, but most especially in the fingers and toes; of continuous pain in the left side over a fixed spot not larger than half-a-crown; and of a pain which she had had, "on and off," for years, between the left shoulder and the spine, and in the shoulder itself. She also complained of headache, which came on each morning; and of dreadful, and almost continuous, aching in the lower part of the back—so severe, that often she could not stand upright.

She was troubled with excessive irritability of the bladder, often involving the necessity of urinating about every five

minutes. This trouble had continued since her last confinement, which occurred about eighteen months previously.

The menses were very scanty, lasting but two days, and needing the use of only two napkins. They were preluded by leucorrhœa nearly as much, she said, as her "regular discharge," and continuing a day or two after it stopped. She also suffered from bearing down of the womb, and from habitual coldness of the feet. The bowels acted regularly; there was excessive tenderness along the lower half of the spine.

I prescribed as follows:—℞ Ammonii chloridi, gr. v.; Infusi calumbæ, ℥j., bis die; and the application of the Lumbar Ice-bag, placing the bottom of it on a level with the fourth lumbar vertebra, during forty-five minutes, twice a day.

January 11th.—The patient had used the ice only four times, but she reported the pain in the limbs to be so nearly gone that she had scarcely felt it once; she said she had found the Ice-bag unpleasant in the day-time, but a great comfort to her at night. I advised her to use it at night only, and to continue the medicine as before.

Jan. 18th.—She had borne the ice quite well; she made water then about every hour; the head and limbs continued clear of pain; the pain in the left side was less acute, and sometimes went quite away; the pain in the back—her worst trouble—was wonderfully relieved. Appetite improved.

February 5th.—Began to menstruate on the 31st ult.; the flow continued day and night during three days, and was much more copious than usual. She used the ice ninety minutes twice a day during each of the three days of menstruation without any discomfort whatever; she said her back was wonderfully better.

Feb. 22nd.—She reported herself on the whole much better: she made water less frequently again; and she added,—"I don't have that distressing bearing-down feeling as I did. I feel the ice such a relief and refreshment for several hours after I have used it."

March 14th.—She had not used the ice during the previous ten days; she continued, however, quite free from neuralgia; she had suffered from a little cough for about a fortnight. On the 8th March she had slight hæmoptysis (while in church), and again on the 13th. She felt a fulness of the chest at the right of the lower part of the sternum. She then told me for the first time that she spat blood twelve years ago. Pulse feeble and irregular. I prescribed—Acidi nitrici diluti, ℥x.; Quinæ disulphatis, gr. j., ter die.

March 28th.—The patient continued free from neuralgia; hæmoptysis had not recurred, and the cough had subsided.

May 6th.—She remained free from all pain; she had men-

struated a few days previously, and she remarked that the menses, which used to be scanty, intermittent, and painful, were now copious, continuous, and painless.

May 13th.—The patient had had no recurrence of pain of any kind. The leucorrhœa, which formerly preceded menstruation, had quite ceased to do so; and all the other symptoms, on account of which she consulted me, had subsided. At this date the patient reported herself well, and therefore ceased attendance at the Dispensary.

October 28th, 1869.—She came again in order to obtain advice for her child. She looked extremely well, and said that she had had no relapse, and that she had never enjoyed such excellent health for many years as she had done since May, 1868.

Case 26.—*Dental Neuralgia.*

H. E., female, aged twenty-one, suffering from violent pain, spreading over the teeth and gums of both the upper and lower jaw, consulted me January 17, 1868. The pain was most intense in the lower jaw, and on the left side. She had headache also. The forehead and cheeks were notably hotter than normal, and the patient complained of great heat in the roof of her mouth, as well as in her gums, which were swollen and sore. During the previous week she had had several teeth stopped with gold, and one of them—the left upper incisor—subsequently became most especially painful, with swelling, and threatenings of an abscess at its root. I prescribed the application of a ten-inch Spinal Ice-bag across the occiput. The pain was annulled on several occasions by this treatment. But the tenderness of the incisor tooth just mentioned persisted, and the new stopping in it kept up and increased the irritation. The pain throughout the whole of the parts described came on in the same way as before, but more violently; now the re-application of the Spinal Ice-bag across the occiput failed to subdue it, and it became intolerably violent. In despair, the patient tried the application first of cold, and then of heat, directly to the seat of pain, but without obtaining any relief. On the 19th, Sunday, finding her in this state of extreme suffering, and knowing that she could not on that day go to the dentist and have the stopping taken out of the tender tooth, I applied a double-columned Water-bag, containing water at 120° Fahr., over the cilio-spinal region. The first application lessened the pain, and the second took it away. The patient's previously hot and aching forehead became perceptibly cool and moist meanwhile, and she felt a strong inclination to sleep. During the

second application she remarked that the inside of her mouth had become much cooler, and the temperature of her cheeks fell so much that they felt cooler than normal. This was about 9 p.m., and she continued free of pain about two hours. Eating her supper brought it on again, when it was again subdued by the bag as before. About twelve o'clock she went to bed, and, as I had requested, applied the Spinal Water-bag by lying upon it. She soon went to sleep on the bag, and continued sleeping between three and four hours, after which the pain recurred. She applied heat again, as before, and again slept about an hour. She was then awoke by a fresh attack of pain, which seemed worse than before, and which continued till daylight, when she got the Water-bag refilled, and again applied it. It quickly soothed her, and enabled her to sleep; and when she awoke she was free from pain. In the course of the day she went to the dentist, who, instead of unstopping the tooth mentioned above, stopped three others. The patient's sufferings were afterwards aggravated; and in the evening of the same day I prescribed the continuous use of the Spinal Water-bag (at 120° F.) to the cilio-spinal region, and simultaneously the application of a Spinal Ice-bag across the occiput, or, if found more soothing, over the seat of pain. I also prescribed a drachm of sulphate of magnesia, to be taken at bed time. The patient obtained almost complete freedom from pain during the evening, when using the cold and heat together; but soon after they were omitted she was reminded that her enemy was only at bay, and feared fresh attacks during the night. She therefore re-applied the Spinal Water-bag, and lying upon it after going to bed, soon fell asleep, slept all night, and woke up the next morning quite free of pain. By immediate recourse to the same treatment, modified as seemed desirable, whenever the pain came on again, its tendency to recur was at that time subdued, notwithstanding the fact afterwards ascertained that an abscess was being developed at the root of the left upper incisor tooth. Ultimately this tooth was unstopped, the pus escaped, and the pain, which had been reflected on to the sound teeth of the lower jaw, did not then recur.

CASE 27.—*Neuralgia of the Hands and Feet; Numbness and Partial Paralysis of both Hands; Hæmorrhoids; Coldness of the Body generally, and of the Lower Extremities especially.*

A. W., male, aged fifty-six, first seen by me January 20, 1868, when suffering from severe pain in both hands and both feet. He also complained of numbness in both hands. The pains which

were restricted to the hands and feet were of a shooting character, and came on with astonishing suddenness—often, the patient said, as if he had received "a violent blow upon the nerves." The pains were quickly induced by motion of any one of the four limbs. Pains shooting to the tip of the little finger, and sometimes along the ring finger were immediately produced if pressure were made on the ulnar side of the dorsum of either hand. Pressure on the radial side of the dorsum of the left hand produced pain in the forefinger. The pain in the feet began at the metatarso-phalangeal joint of each big toe and flew upwards as far as a little above the internal malleoli. Stretching out his leg, for example, when putting his trousers on caused the patient acute pain in the feet. The hands had become weakened as well as numb: he could only extend his left hand partially, and his fingers were so weak that he was disabled from doing his usual work on that account alone; but, in fact, he suffered such severe pains and so constantly when moving his limbs, especially if he made any effort, lifted anything requiring the slightest strain, or even suddenly twisted the hands slightly that he was almost disabled from continuing at his employment—that of a piano-maker. He began to suffer in this manner about ten months before he consulted me. The pains came on in the hands first, and in the feet a few weeks afterwards.

He did not suffer from headache; could stand equally well, and for a considerable time, on each leg, and there was no tenderness in any part of the spine. Pulse, 75; bowels open daily. He was troubled with hæmorrhoids which had continued "fifteen or twenty years." Reproductive organs healthy. He suffered very much, he said, from general coldness, and had become more "chilly" than he used to be. His feet were often cold for a couple of hours after he went to bed, he "could hardly sleep for them." The sensitiveness of his hands as well as his visual power was much below the normal standard. In the right palm he could not feel the two points of the æsthesiometer until they were eight lines apart, and not until they were twelve lines apart in the left. Without glasses he could not read smaller test-type than $5\frac{1}{2}$ with either eye.

Eighteen months before he consulted me he became a teetotaller; previously he had been in the habit of drinking freely. Possibly, this habit may have contributed, at all events, to originate his neuralgic malady, and probably domestic misery, of which his wife's habitual drunkenness was an element, may have operated as its exciting cause.

The patient was sent to me by another physician who had treated him by means of drugs but without avail. I prescribed no medicines at all, but treated him exclusively by means of the

Spinal Ice-bag, which owing to the presence of hæmorrhoids had to be applied with especial care.

January 29.—The pains in all four limbs had already much lessened, and pressure in each hand caused only very slight pain —scarcely any in the left hand. He could move his hands violently without producing any pain at all. The pain in the right foot had shifted from the inner to the outer side, and the motion of stretching out his legs—when putting on his trousers for example—caused him only "very slight pain, indeed." He said, "I've become generally warmer all over, just as I used to feel several years ago; directly I put the ice on, my feet become warm, warmer than I can get them by the fire." The tingling in his hands had lessened, and their sensitiveness has considerably increased. In the left palm he had become enabled to feel two points at four lines apart, and in the right at only three lines apart! He could read test-type 4½, though with some difficulty.

February 13.—The pains were still more lessened and were shifting about. He could thrust out both hands and both legs violently without producing any pain at all. His hands, especially his fingers, had become much stronger as well as more sensitive, a beneficial change proved to him he said by the fact that he could scrape the top wood of the grand pianos far more effectively than he had been able to do for months previously. He said, "I continue to keep quite warm: while watching outside Broadwood's premises on a very cold night I was very warm all night," whereas previously, as he assured me, when watching on less cold nights and in just the same clothes he was very cold. Could read test-type 4½ easily, and 3½ with difficulty.

Feb. 27.—The patient reported, "There is not the slightest pain anywhere while I remain still; I never feel it." He could now extend the left hand vigorously and completely. He continued warm.

August 5.—At this date the patient informed me that the pains in all four limbs had gone and were not now inducible by movements. His thumbs had become much stronger, the re-acquired sensitiveness of each hand had continued; he ate well, and he slept "a great deal better" than formerly. I then prescribed—Ferri et quinæ citratis, gr. iv., bis die. He had continued the use of the Spinal Ice-bag until this date. I regret that during the previous five months I had kept no record of the progress of his recovery, and especially that when I saw him at this date I did not note the exact degree of his visual power—a point of great therapeutical interest.

April 1, 1872.—I wrote to this patient begging him to call upon me, and he did so at this date. He was quite free from

both pain and numbness, and his hands were thoroughly strong. He said, "Nothing has ever been the matter with me since you treated me except last summer when I had my great toe smashed. I went to the hospital and was at work again in three weeks." No neuralgia came on. He said that he had ceased to be troubled with piles, that the bowel merely came down a little occasionally when he was at the water-closet, but that it was easily replaced and caused him no inconvenience. His bowels had acted daily with remarkable regularity. He had continued warm all over. He began his report of himself in these words: "One very curious thing has happened to me, I used to have very cold feet, I may call them excessively cold, in bed; since I've used the ice I never have a cold foot!"

CASE 28.—*Neuralgia of the Back and Shoulders; Itching and Swelling of the Hands; Headache; Giddiness; Cough and Copious Expectoration.*

January 22, 1868.—Eliza H., aged thirty, married, complained of great pain in the head, with frequent giddiness. She had suffered in this way almost every day for some hours, upwards of a month, and both the pain and giddiness were increasing. She was also much troubled with pain and aching over the shoulders—most over the left, also on each side of the lower cervical and upper dorsal spines, where there was some swelling and great tenderness. She said that she had aching also of the four limbs, of the kind caused by fatigue. These pains were intermittent, but not periodic. "At one part of the day I feel," she said, "very well; at another I can hardly move." About three times a week for several weeks past her left hand had swollen, and had become hot, and red, and numb,—"just as if," she said, "I were going to lose the use of it." It was not painful; but before it swelled it itched for a few minutes. The swelling lasted upwards of an hour. "It had never been quite right," *i.e.*, it had always felt more or less numb since it began to swell. Had a troublesome cough, with copious expectoration. Bowels fairly regular. Urine pale. Menses healthy. Feet always very cold. I prescribed the application of ice along the upper third of the spine thirty minutes twice a day; also Ammonii chloridi, gr. v.; Infusi calumbæ, ℥ s., bis die.

Jan. 29.—The cough and quantity of mucus expectorated were decidedly lessened. I then requested the ice to be applied along the upper two-thirds of the spine, and prescribed Infusi calumbæ, ℥j., bis die.

February 1.—The aching of the limbs had ceased; the itching

and swelling of the hand had ceased, but had appeared in the face and one knee. I advised the application of ice in each cell of the 20-inch Ice-bag forty-five minutes twice a day.

Feb. 15.—Had been unable to provide herself with ice during the last fortnight, and was suffering much in the same way as when she first consulted me. She promised faithfully to use the ice as prescribed. ℞ Infusi cinchonæ, ℥ss., ter die.

Feb. 26.—Had used the ice regularly as ordered. All the symptoms complained of had subsided, and the feet were warm ; but she complained of great pain over the anterior part of the crest of the right ilium. Bowels constipated. There was still great tenderness over the cervico-dorsal vertebræ. I requested her to apply the ice as before, but from 90 minutes to 120 minutes twice a day ; to continue the mixture, and to take aperient pills when needful.

March 18.—The pain in the head and giddiness were very much better, but had not wholly ceased. The pain and aching over the shoulders and each side of the spine, and the aching of the limbs were quite gone, the cough and expectoration also. No swelling or redness had recurred, and the numbness was no longer felt. To continue the treatment as before.

April 18.—Reported herself well. Feet warm. Treatment discontinued.

CASE 29.—*Paroxysmal Neuralgia of the Head, Face, Mouth, Throat, and Extremities ; Swelling and Tenderness of the Scalp ; Convulsive Twitchings ; Numbness ; Weakness of the Right Side ; Headache, Dimness of Sight, Mental Confusion, and Loss of Memory ; Constipation of the Bowels ; Excessively Frequent Micturition ; Defective and Painful Menstruation ; Prolapsus Uteri ; Habitual Coldness of the Extremities.*

January 25, 1868.—S. T., female, aged forty, married, consulted me at the Farringdon Dispensary, on account of a remarkable complication of neuralgic troubles. She suffered from neuralgic paroxysms every day ; they were worst in the head and face, but involved the four limbs also. The pain of the head was chiefly on the right side, reaching to the vertex, and in the forehead. She had often acute, throbbing headache, and at the same time superficial shooting and burning pains over the scalp, which, during the attacks, was notably swollen—especially in the forehead—and very tender. The pain and burning heat often invaded the roof of the mouth and the throat. During the

paroxysms of "plunging, shooting pain," as she described it, she suffered from violent twitchings, which, she said, were "just like the cramp," over the right side of the head and chiefly in the temple. The pain often extended along the right side of the neck, arm, and fingers; she had cramps in the left hand—generally once or twice a day, and frequently in the night. When the pain passed down the arm, the muscles of the right leg, and especially the flexors of the toes, were also twitched or contracted, and the leg felt heavy. The left leg was becoming affected in the same way. The patient said that when she got up in the morning her forehead began to swell, but without pain; that in about an hour afterwards the pain came on, and usually continued excessively violent during about a couple of hours. Simultaneously with the swelling of the forehead the sight of both eyes became dim; the dimness lessened when the pain subsided. She said that the feeling in the roof of the mouth was "like the cramp," that she felt a distinct twitching in the right side of it, and that drinking warm liquids pained her in that part. She complained that the hands and feet were frequently numb. Her sufferings had so affected her head, that her mind had become seriously impaired. She experienced great mental confusion and loss of memory; she said,—"I've frequently thought I should go out of my mind with my head. I can scarcely recollect anything. I've often given people wrong change at the counter (she kept a small shop), and trembled so I've not known what to do." She was in the habit of sitting for hours without speaking to anybody. When the attacks came on she disliked her husband and children, and wished them away from her. She began to suffer in the head about two years before I saw her: the attacks commenced with a burning pain at the top, gradually increased in severity, and during the previous twenty months she had never, she believed, passed a whole day without pain. She suffered from excessive coldness of the feet and knees. She found that putting her feet in warm water relieved her head. Menstruation was regular, but extremely defective and excessively painful. She suffered from prolapsus uteri, on account of which she began to have medical advice two years previously. She made water about every ten minutes in the daytime, and was obliged to get up frequently in the night to do so. This trouble had lasted about three years. Tongue fairly clean, bowels constipated. Pressure on the spines of the upper cervical vertebræ caused overwhelming pain, and also a distressing feeling in the roof of the mouth and down the throat. When the pressure was applied on the third vertebra, it affected the throat lower down than did pressure on the first and second. Pressure on the lower cervical vertebræ did not cause pain, but there was great tenderness between the scapulæ, and pressure there caused her

also to feel the distress in the throat, and induced great faintness. I prescribed as follows :—℞ Misturæ cinchonæ, ℥j. ; potassii iodidi, gr. ijss., bis die. Apply ice during forty-five minutes twice a day along the lower third of the spine.

Jan. 29th.—The pain in the head and arm was not quite so severe, and the roof of the mouth was better. The patient thought her feet "had seemed once or twice to come warm, and they were fuller than they had been." Treatment as before.

February 5th.—The burning pain at the top of the head and the pain in the face were less severe ; the pain in the arm and the pain and burning in the roof of the mouth and throat were again lessened, and she had less throbbing than before. I said to her,—"The ice did not make your feet cold, did it ?" "No, sir," she answered, "it did not ; indeed, they are rather warmer than they were—my hands too ; and my appetite has been very good this last week. I have seemed better altogether. I've felt relief of the headache in ten minutes after I've put on the ice." I advised her to continue its use during sixty minutes twice a day, as last ordered, but also to apply an Ice-bag across the occiput, from ear to ear, each morning an hour before the attack came on.

15th.—The swelling, as well as the pain down the front of the face, was lessened ; "the cramping pains" of the right arm were gone, there being only a "numb feeling" left. The patient found that the Ice-bag across the occiput gave her great relief. She had menstruated during the previous week, and "more plentifully than for the last two years." The flow continued during three days, and was accompanied with much less pain than usual. The ice was applied along the spine throughout the period during sixty minutes twice a day, as usual, and was found to be "a great comfort." She said,—"The ice is beautiful. If you are lying in bed with the ice on, it's wonderful how warm your feet get ! You don't notice it so much when you're up and about. My hands, too, are not so cold ; I seem altogether very different." Treatment as before.

22nd.—The cramps in the hand were reduced to a "slight twitching only :" the patient was now obliged to pass water only three or four times a day, and she "very seldom" got up in the night to do so. She was requested to continue the ice as before, and to take Infusi calumbæ, ℥j. ; potassii iodidi, gr. ij., ter die.

27th.—The hands and feet were less numb, and the legs felt lighter ; the headache was steadily lessening, and the twitchings were nearly gone. Yesterday a paroxysm was cut short within five minutes after the application of ice across the occiput. She said,—"It's wonderful the benefit I've received ; I used n't to know scarcely what I was doing,—now I am altogether much more clear." I advised her to omit the medicine, and to apply

the Spinal Ice-bag along the whole spine twice a day during sixty minutes.

March 7th.—The paroxysms, which before treatment came on about 9 a.m., had become retarded till about noon. The numbness of the hands and left arm was much lessened. The right hand was well, and there was only very slight numbness in the left hand. Before treatment the left leg was both heavy and numb from the hip to the foot inclusive: at this date the foot alone was numb, and that only while she was walking. She was requested to continue the ice as before, and to take Ferri ammonio-citratis, gr. iv., bis die.

14th.—The attacks at this date kept off until 3 or 4 p.m., and were less severe than they were a week previously. Bowels regular without aperients. She made water not more than four or five times in the twenty-four hours. Treatment as before.

21st.—The neuralgia of the head was still lessening, and the attacks did not recur till 4 or 5 p.m. "The womb," she said, "is much stronger; it does not come down as it did." Her head continued clearer. She said the ice made her long to go to sleep in the daytime, but that her business prevented her. Treatment as before.

28th.—The two previous days had been passed wholly without pain; it was then two years since she had had a like experience. Appetite improved; bowels open daily. She said,—"The Ice-bag has, I think, regulated the bowels, for they were always confined, very often a week together. And I sleep better; not so heavy in the head. I used to be very heavy in the head. The numbness has quite gone from the hands." Treatment as before.

April 18th.—She had been several days without an attack, "and when one comes on," she said, "it's merely a passing over the head, and lasts only about fifteen minutes." She menstruated about a fortnight previously, during a full week; the flow was much greater, and the pain much less than formerly. The numbness in the head was going. ℞ Ammonii bromidi, potassii bromidi, ana gr. v., terdie. I requested her to continue the ice as before.

May 2nd.—She was in every respect better; she had had only three attacks during the previous fortnight; she was stronger, and had better appetite and spirits than she had had for eight years before. She remarked,—"I really don't think I shall ever be able to do without the ice, it is so comforting." ℞ Ferri et quinæ citratis, gr. v., bis die. Ice as before.

13th.—Went many days without pain at all in the head—was, in fact, "very nearly free from pain altogether." Her mind was quite clear, and her memory so improved that she said, "I can

recollect anything now." She had, however, still some temporary swelling of the scalp "most days." All twitching, and nearly all numbness, had ceased. The right side, which had been very weak for seven or eight years, seemed, at this date, as strong as the left, except when she walked far, or made great exertions. She menstruated copiously the previous week, and without any pain at all. ℞ Syrupi ferri iodidi, ℥j., bis die. Ice as before.

20th.—She continued quite free from pain: she had passed three weeks without having a severe attack. Her sight was greatly improved. The numbness was gone entirely, unless when she walked. Her complexion, which had been dark and sallow, had become remarkably clear, and she looked thoroughly well. She said,—"Recovery from my long illness seems like as if I were waking from a dream, for I was scarcely conscious when I came to you first." Treatment as before.

I saw this patient a few times more during the summer. She continued free from attacks, and reported her health quite restored.

CASE 30.—*Neuralgia of the Right Side of the Head, Face, and Neck, and of the Right Upper and Lower Extremity, associated with continuous Aching across the Sacrum, Partial Closure of the Right Eye, Lachrymation, occasional Unsteadiness in Walking, Extreme Coldness of Both Knees, Heavy Sleep, and unduly Frequent Micturition.*

February 26, 1868.—William E, complained of neuralgia over the right side of the head, face, neck, shoulder, and in the first phalanges of the middle and ring fingers of the right hand; also of twitchings or spasms of the right side of the face and head, sometimes almost closing his eye, which, during the paroxysms, shed tears. He was also troubled with great, continuous, and deep-seated aching in the sacral region. The pain extended along the outer half of the thigh, into the right knee, and sometimes along the right leg and foot to the toes. He also suffered in the right hip-joint, and sometimes in the left. The pain came very suddenly in the right knee, and sometimes he was unsteady in walking, especially when going down stairs. Both knees had been extremely cold during at least twelve months previously, in summer as well as in winter. He made water about ten times a day, and had a distressing feeling in the pubic region just before urinating; tongue furred; bowels generally open, but at that time rather constipated; pressure on the third, fourth, and fifth lumbar vertebræ caused great pain. The patient began to suffer from neuralgia about seven years previously, and had

had numerous attacks. I prescribed—Pil. colocynth. cum hydrarg., gr. v., p. r. n.; and, Ammoni chloridi, gr. v.; Infusi gentianæ, ℥j.; bis die.

March 4th.—Felt a little better; but, on the whole, the neuralgia was much the same: there was no decided improvement. I ordered the Spinal Ice-bag to be applied along the whole spine sixty minutes, twice a day; the mixture to be discontinued, and the pills still to be used when the bowels were confined.

March 11th.—The patient was completely free from neuralgia in all parts of the body, except the left hip and thigh down to the knee, in which it had become worse. The bowels were "very regular without medicine." Was passing water only about four times a day, and had lost the distressing feeling in the pubic region. The knees felt much better. He said,—"I've noticed particularly that they've become much warmer."

I prescribed the application of ice along the lower half of the spine sixty minutes, twice a day, and the following medicine:—Potassi. bromidi., ℥ij.; Aq. camph., ℥viij.; capiat., ℥ss., bis die.

March 25th.—He had now been for a considerable time quite free from pain in the arms and legs. The pain in the back, though still there, was much lessened. His sleep had become much less heavy, and much more refreshing than formerly. He was advised to continue the ice as before, and to take ferri et quinæ citratis, gr. iv., bis die.

May 9th.—He continued quite free from pain everywhere except across the sacrum, where it recurred occasionally, and only when he sat down. He was requested to continue the ice and medicine as before.

June 27th.—The patient reported that he had used the ice and medicine as last prescribed during a week, but not afterwards, and that he had continued quite well in all respects.

CASE 31.—*Headache; Pain across the Sacrum; Vomiting; Excessive Micturition; Deficient and Intermittent Menstruation; Leucorrhœa; Constipation; Coldness of the Feet.*

Sarah S., aged forty, complained March 7th, 1868, of severe and persistent headache; also of intense pain across the sacrum, especially when she stood or walked. Her stomach was extremely irritable: she felt, she said,—"a dreadful sinking at the pit of the stomach," and she vomited very frequently, especially in the mornings—the slightest disagreeable smell made her vomit. Her menses were usually regular as to time, but were very

deficient in quantity, and were intermittent: generally, after quite ceasing, they re-appeared in a few days during an hour or more. She was habitually troubled with leucorrhœa, with the necessity of urinating ten or twelve times a day, and once or twice a night, and also with constipation of the bowels. Her feet were "always dreadfully cold." I prescribed the application of the Lumbar Ice-bag along the dorso-lumbar region during an hour twice a day; also the following medicine:—Ammonii bromidii, potassii bromidii, āā gr. v.; Infusi calumbæ, ℥j., bis die.

March 14th, the patient said,—"I've been quite free from headache till to day, and the pain to day is because I have not had a bag on. I like the ice very much: it makes me feel quite different to what I've felt before." She had not vomited once, and had felt no nausea. The leucorrhœa had lessened; she passed water less frequently; and she was quite sure her feet had become warm. Her bowels were still confined.

March 21st.—On the 14th, 15th, and 16th she used ice only once daily. She had headache and was sick early in the morning of the 16th; but had neither headache nor sickness afterwards. Still had "a little" leucorrhœa. Her bowels had become open daily. I prescribed the application of the ice, till it melted, twice a day; also Acidi nitro-hydrochlorici diluti, ♏ x.; Quinæ disulphatis, gr. ½; aquæ, ℥j., bis die.

March 25th.—Had had no headache or sickness whatever since previous report. The "sinking at the pit of the stomach was nearly gone;" the pain in the lower part of the back was lessened, as was also the frequency of micturition; bowels regular. Treatment as before.

April 18th.—Had had headache once for a short time; never vomited; "sensation of sickness," rare; pain in the back "very muchlessened." "I can stand," she said, "a much longer time." Menses slightly increased, and of brighter colour; made water about five times a day, and once at night; leucorrhœa still lessened; the feet were decidely and permanently warmer; and she was warmer all over: she said, "I feel myself much warmer with the ice on than when it is off." Bowels regular. Treatment as before.

April 25th.—Had had no headache, and no sickness or nausea whatever, and was, in every respect, improved since the 18th inst. Treatment as before.

May 2nd.—She had a fright on the 27th ult., and while in the consulting-room was trembling—she could not hold her arms still; she became extremely cold and powerless. She had recovered somewhat, but was much shattered. I prescribed the application of ice along the whole spine, sixty minutes, twice a day; also ferri et quinæ citratis, gr. iv., bis die.

May 9th.—Was generally better. The trembling had all but ceased; but she still felt "very nervous." The application of the Ice-bag along the whole spine produced "pain, and a feeling of fulness in the forehead and eyes" each time; these feelings lasted as long as the bag was applied, and came on, she said, "almost as soon" as she put it on. I requested her to apply two cells of the Spinal Ice-bag along the lower two-thirds of the spine twice a day till the ice had melted. [N.B.—She volunteered the statement that she had tried the Lumbar Ice-bag, and found that it caused no pain.]

May 24th.—Had had no more headache or trembling; but complained still of "a sinking at the stomach." I ordered the medicine and the ice as before.

July 8th.—Every symptom of which she complained had now disappeared: she reported herself quite well in every respect, and the treatment was discontinued.

Case 32.—*Intensely Painful Clonic Contractions of the Trapesius and Complexus Muscles of the Right Side.*

W. D., aged sixty, came to me on March 11th, 1868, suffering from clonic contraction of the trapesius and complexus muscles of the right side, which he felt for the first time in the beginning of the previous December, and which had been steadily increasing since that time. He twisted and jerked his head violently over his right shoulder; he had great pain at the scapular origin of the trapesius, and at the occipital attachment of the complexus and trapesius; pressure on the second cervical spine produced extreme pain. He had no headache; bowels open only about twice a week; bladder healthy. I prescribed Pot. brom., gr. viij.; Inf. calumb., ℥ss., ter die.

March 28th.—The patient was no better. He said that the pain was awful, that it continued for hours every day, and that it was even extending down the back, and along the left shoulder and arm. I advised that ice should be applied along the whole spine, quite up to the base of the brain, until it had melted, twice a day; and that the patient should continue to take the medicine already prescribed.

May 2nd.—The pain was much lessened. The patient said that he was now often an hour without any pain, even when the Spinal Ice-bag was off. The arm was disposed to move; the pain in the shoulder had almost subsided. I requested the Spinal Ice-bag to be applied as before whenever the symptoms recurred.

May 18th.—The patient continued the application of ice up

to this date, when he went into the country. The pain had become so subdued that, after having a refreshing night's sleep, he rose in the morning without any pain ; some days the pain did not recur at all, and when it recurred the application of the ice stopped it at once. Since being under treatment, his appetite and sleep had improved wonderfully ; and after his return to London he reported himself quite free from his malady.

CASE 33.—*Headache ; Uterine Neuralgia ; Retarded and Deficient Catamenia ; Loss of Appetite ; Coldness of the Feet ; Extreme General Weakness ; and Mental Apathy.*

E. F., aged nineteen, consulted me March, 18, 1868, when she was suffering as follows :—She had headache very often, and for many hours together. At each menstrual period she experienced such acute uterine pain, that during the first day she was wholly incapacitated from doing anything. She began to menstruate when she was sixteen years old, and the catamenia recurred in a healthy manner only two or three times ; afterwards six, and sometimes eight, weeks elapsed between her periods, and the flow became so slight that she said, " I hardly ever know whether I'm unwell or not." Her appetite had become extremely enfeebled, and she was unable to take any breakfast at all ; her feet were habitually very cold ; she had become extremely weak, both physically and mentally—in fact, she complained most especially of great languor and apathy, of feeling incapable of taking interest in anything.

The patient was submitted to the Neuro-dynamic treatment during a year. The only medicine she took consisted of citrate of iron and quinine—five grains twice a day, during the month of May. On the 25th of March she described herself as feeling lighter and better, and said that her feet had become quite warm. In April she menstruated during four days—from the 7th to the 11th inclusive. May 2nd, she reported that she had headache only once during several weeks, and that she felt " much lighter and more spirited." In May she again menstruated during four days—from the 9th to the 13th inclusive, the Spinal Ice-bag being used as directed, without causing any discomfort meanwhile. Her progress continued uninterruptedly : the menstrual function became thoroughly healthy in respect to the periods of its recurrence, its duration, and copiousness—the latter being greatly increased ; she was completely free from both headache and uterine pain ; her feet continued normally warm ; she regained her appetite and natural vigour ; and, on the 27th March,

1869, when I last saw her, she said,—"I've come to tell you how well I am." She looked, indeed, wonderfully improved, and assured me that she felt in all respects quite well.

CASE 34.—*Neuralgia of the Head and Face, together with Mental Confusion and Depression, occurring chiefly at Night, and, including periods of remission, of about Five Years' Duration.*

March 28, 1868.—A. J., female, aged twenty-five, complained of violent pain in the face on both sides, and in the right temple, extending backwards to the centre of ossification of the parietal bone. The pain, she said, "shoots, darts, and travels about." If she went out at night, it came on when she returned home, and kept her awake all night: sometimes it subsided in the morning; sometimes it continued throughout the whole day following a bad night. The neuralgia was usually associated with headache, more or less general, confusion of ideas, mental apathy, and depression. The patient described her state during her attacks by the phrase, "general numbness in the head." She was in pain while consulting me. She said that while her head ached it was cold. She felt extremely "sensitive and unstrung" during her attacks, and for some time afterwards. Tongue clean; bowels regular; menstruation normal; feet usually warm; pulse 80—good. The patient began to suffer as described about five years previously. At the beginning of 1867 she had a severe shock from the death of a brother, and for several months afterwards her sufferings were almost continuous. She was treated solely by the Neuro-dynamic method: no medicines.

April 4th.—She reported that she had had no neuralgia since she began to use the ice—on which, almost every night, she had fallen fast asleep. On returning home one night with headache the ice took it away. Felt altogether better, and had a great deal better appetite; felt so well, in fact, that she left off the ice the previous morning. Began to menstruate on the morning at the end of three weeks, instead of a month as usual. I directed that after menstruation had ceased, she should apply the Spinal Ice-bag once a day along the whole spine during forty-five minutes.

May 21st.—The patient said she had applied the ice, as directed, for a short time after her last visit; but that feeling quite well she soon discontinued its use. She had had no pain whatever, and described herself as "perfectly well."

CASE 35.—*Intense Headache; Acute Pain in the Four Extremities; General Swelling and Extreme Tenderness of the whole Body; Ulceration of the Tongue; Constipation of the Bowels.*

L. C., female, aged five, was brought to me at the Farringdon Dispensary, April 15, 1868, in great suffering—in fact, her whole body seemed to be painful: she could not bear her mother or any one else to touch any part of it. The limbs were very perceptibly swollen, and her mother said the body generally was swollen. In the course of a few days she had seemed to become considerably stouter than before. Her skin was hot; she was extremely thirsty; she had a very troublesome, and almost incessant, dry cough; there were several ulcers on her tongue, from two to three lines in diameter; and her bowels were constipated. She could not bear pressure on any part of the spine. I regret very much that I did not record the state of her pulse.

About a fortnight before I saw the child she began to complain of headache, which became increasingly severe. On April 9th she became decidedly ill, and could scarcely run about, and marked thirst and feverishness—the skin becoming hot—supervened. On the 13th she began to complain of pain in all her limbs; on the 14th her shoes could not be got on; and on the 15th, when she was brought to me, she was so generally, and so painfully sensitive that she feared lest anyone should touch her. On the morning of that day her mother was particularly struck by the fact that the left side of her face, and of her neck down to the shoulder, was especially swollen. The swelling was most obvious in the feet and hands. During several nights her arms were violently jerked as she lay in bed. Her cough began about a fortnight before I saw her; it steadily increased, and became so incessant as to prevent her mother from getting any rest at night. During the first ten days of her illness her bowels were relaxed; then they became constipated. I prescribed no medicine, but directed that ice should be applied along the whole spine during ninety minutes three times during the day.

April 16th.—I saw the child at its home: she was lying quietly in bed, and told me that she had no headache, and no pain in her limbs. I could perceive no swelling in the hands, feet, or face, and could handle freely any part of the body, exerting pressure on the hands and feet, without causing pain. There was still considerable feverishness, and the ulcers on the tongue appeared much the same as on the previous day. The child had, however, slept a good deal in the early part of the morning. I now requested that she should be sponged all over with

warm water, and that the use of the Spinal Ice-bag should be continued as before.

April 18.—The little patient had borne the ice thoroughly well: both her father and mother stated that each time it was applied it soothed her in a remarkable manner; and the mother added that only at the end of the hour when the Ice-bag had ceased to be cold did the child evince impatience. Headache, which I asked particularly about, was no longer complained of. Her body exhibited no perceptible swelling anywhere, but there was tenderness of the arms and hands again to-day, causing her to cry when they were pressed upon. The arms were still hot, but the feet had become cool, and were no longer tender. I ordered the bowels to be kept open by means of castor oil, and the Spinal Ice-bag to be applied four times a day, great care being taken to remove it as soon as it should cease to be cold.

April 25th.—I found the child sitting up in bed eating a plum tart, and quite free from pain, which was not produced even by pressure over any part of the limbs. I requested the ice to be applied three times a day, and full doses of citrate of iron and quinine to be given also three times a day.

May 2nd.—The patient walked across the room for the first time: she had no pain in the back. I requested the ice to be used now only twice a day.

May 6th.—She walked to the Dispensary with her mother to-day, and continued free from pain. I ordered the discontinuance of the ice, and requested that as much nourishment as possible should be given, and that the tonic should be continued.

May 9th.—The child ran about, talked and sang. The appetite had much improved; she could now take flesh meat. Her mother said "the child is wonderfully well now." I advised the continuance of the tonic medicine a little longer, and at this date the patient ceased attendance at the Dispensary.

CASE 36.—*Intense Headache; Constant Aching, Swelling, and Tenderness of the Limbs; Tonic Contraction and Hardness of the Muscles at the Back of the Neck, and of those of the Fore-arm; Excessive Constipation of the Bowels.*

April 16th, 1868.—When visiting on the first occasion the patient whose case is numbered 35, I found her sister, C. C., aged fifteen, suffering in like manner. She complained of intense headache, which had lasted eleven days, and of constant aching of her four limbs. She seemed to be in a state of semi-stupor; her limbs were swollen, but to a less extent than her sister's were;

her right hand, however, particularly over the thenar eminence, was much swollen, and the fingers of the same hand were so spasmodically flexed that she could not extend them by any effort of her will. Owing to the powerful tonic contraction of the muscles at the back of the neck, her head was all but immovable. These muscles were remarkable hard, and pressure on them, as well as on those of the extremities, caused acute pain. The spine was decidedly tender, but less so than that of her sister. Her complexion was dusky, and her bowels were extremely constipated. I ordered the Spinal Ice-bag to be applied along the whole spine ninety minutes three times a day. No medicine.

April 18th.—The headache had subsided, and the mental condition had greatly improved. The swelling was nowhere perceptible, but there was slight spasmodic contraction of the left hand this morning. The pain in the limbs was all but gone, and she could move her head freely. I now requested the Spinal Ice-bag to be applied only twice a day.

April 20th.—The patient reported herself well, excepting that she felt some pain in the left epigastric region. Her complexion and expression had become remarkably clear. I advised the continuance of the Spinal Ice-bag twice a day.

April 25th.—She continued to improve very satisfactorily, and the Spinal Ice-bag was ordered to be applied only once daily.

May 6th.—The patient had become quite well, and the treatment was discontinued.

CASE 37.—*Severe and Prolonged Headache; Infra-mammary Neuralgia; Deficient and Unrefreshing Sleep; Excessive Constipation of the Bowels; Unduly frequent Micturition; Deficient and Retarded Menstruation; Profuse Leucorrhœa.*

C. S., aged twenty-two, came to me, May 16th, 1868, suffering from intensely oppressive headache, which had continued since the middle of the previous December, and had been increasing in intensity since that time; but she said, "I seem to have been always affected in my head." She also complained of almost continuous pain beneath the left mamma. The whole spine, but especially the lumbar region, was very tender. The bowels had not been moved during the previous five days, and were often as long without action. Urinated about six times a day. She began to menstruate when between fourteen and fifteen years of age, but the menses had been always more or less irregular: ordinarily she went six, but had even gone ten weeks without menstruating;

she had had profuse leucorrhœa since the previous Christmas; and her sleep was deficient and unrefreshing. I advised her to apply ice to the lumbar region during ninety minutes twice a day.

May 20th.—Her headache and sideache were already much relieved, but her bowels were still constipated. I prescribed an aperient saline and the continuance of the ice as before.

June 27th.—The patient had used the ice as ordered until 21st June, and found its application very agreeable. The headache was "very much lessened;" all the intense shooting pain had gone; menstruation had been much more copious during the last period than formerly, and the pains she usually suffered were very much lessened. The leucorrhœa was nearly gone. Bowels "quite regular." She said—"My sleep is much improved; in fact, I am nearly quite well." At this date the patient went into the country and the treatment was discontinued.

CASE 38.—*Severe Neuralgia across the Sacrum, and in the Left Hip, Leg, and Foot; Pain and occasional Swelling of the Hands and of the Right Knee; Globus Hystericus; Excessively Frequent Micturition.*

F. E., aged sixty, one of Dr. Drysdale's patients treated by me at his request, complained, May 20th, 1868, of great and almost continuous pain across the sacrum, so extreme that it wore her out; also of pain in the left hip, and down the outer side of the leg to the sole of the foot, and toes. Had pain in, and sometimes swelling of, the right knee also, which prevented her from walking, and to which she sometimes applied a mustard poultice. The hands, too, were painful, with pricking, shooting, and swelling of a gouty nature. She was also distressed by a burning lump in the throat, which especially troubled her when she swallowed. She urinated about every ten minutes, and could not hold her water more than fifteen minutes. She suffered but little from headache; her bowels were open daily; and she had no leucorrhœa. Pulse 84. I advised the application of the Lumbar Ice-bag to the lumbar and dorsal region during an hour twice a day.

I did not see this patient again until January 23rd, 1869, when she informed me that the burning lump in the throat, the pain in the loins, and the pain and swelling in the hands, feet, and knees had all been remedied by the Spinal Ice-bag, and that the frequency of making water was much lessened. She had been unable to use ice for many months past; but the relief afforded by the application of it had been both great and speedy.

CASE 39.—*Headache; Severe Pain in the Chest-walls, especially in Front of the Chest, Below the Left Mamma, and in the Shoulder-blades; Severe Cough; Shortness of Breath; Deficient and Painful Menstruation; Leucorrhœa; Constipation of the Bowels; Coldness of the Feet.*

Mrs. P., aged thirty-three, consulted me June 23rd, 1868, when she complained of suffering severe pain in the front of the chest, below the left mamma, and in the shoulder-blades. She had "a dreadful cough," and experienced considerable difficulty of breathing, especially when going up stairs. Her ordinary medical attendant told her her lungs were affected, and advised her to give up work. She very often had headache, which was especially severe during her menstrual periods. She slept "very badly indeed," and had "a very bad appetite." Her bowels were obstinately costive, and she suffered greatly from dysmenorrhœa—the discharge being very scanty, and accompanied with intense pain. She was troubled "occasionally" with leucorrhœa; her feet were habitually *very* cold, and she was extremely languid and incapable of work. I treated her solely by means of the Spinal Ice-bag, no medicine being prescribed.

July 9th.—The pain in the chest and below the left mamma, as well as that in the shoulder-blades, had quite gone; the headache and cough had ceased; the breathing had become easier; the bowels were less costive, being open every other day; and her sense of fatigue was already very much lessened.

July 21st.—There had been no return of the pain in any part of the thoracic region; she began to menstruate July 3rd; the ice was applied during the period as ordered; her menstrual pains were lessened "a very great deal," and the flow was increased; she had no headache whatever during her period; she was sleeping every night "very well indeed;" her bowels were open each day; she was quite free from leucorrhœa; and not only had all difficulty of breathing when walking vanished, but she assured me that she felt as fresh and vigorous as she had ever felt in her life. I did not see her again after this date.

CASE 40.—*Neuralgia of the Right Side of the Face, Neck, Shoulders, Breast, Axilla, and Right Upper Extremity, which was sometimes Partially Paralyzed; Troublesome Lachrymation; Excessively Frequent Micturition; Constipation of the Bowels; Cramp; Coldness of the Feet.*

S. G., female, aged forty-four, married, came to me June 24th, 1868, suffering from neuralgia of the right side of the face, neck, shoulder, breast, axilla and right arm and hand. The latter became partially paralyzed at times. The pain, when least, was, she said, "a nasty smarting;" when worst, fearfully shooting and stabbing, and was almost without intermission. Her eyes watered very much; bowels constipated; menstruation very free; no leucorrhœa; made water two or three times an hour throughout the day; had severe cramps in the legs; feet habitually very cold. I treated her by means of the Spinal Ice-bag and small doses of chloride of ammonium.

June 27th.—Felt somewhat better generally, and felt distinct relief while applying the ice, which she found very agreeable.

July 3rd.—Had used ice regularly, except during her menstrual period. The bowels "were very comfortable." She said the cramps lessened while she continued to use the ice, and increased again when it was left off. The same remark applied to her urination. The neuralgic pain was less intense.

July 22nd.—The patient said the pain was decidedly less frequent and intense, and the arm was stronger. The troublesome lachrymation had nearly ceased. Made water now only two or three times a day.

August 26th.—Had remained free from neuralgia throughout her last menstrual period; but she could not afford to supply herself with ice, and hence the treatment was discontinued.

CASE 41.—*Headache; Uterine Neuralgia; Insufficient Sleep; Impaired Appetite; Deficient Menstruation; Leucorrhœa.*

D. J., aged twenty-four, stated that about a year previously her menses became scanty and painful. When she consulted me they lasted only a day, were very slight, and were preluded by a day of great pain. Since the commencement of the dysmenorrhœa, she had been troubled with leucorrhœa. She had suffered during three years from headache, which had been increasing, and during the latter part of that period she had been "scarce a day"

without it; it generally lasted all day, and sometimes almost deprived her of sight; she was very restless at night; appetite variable; bowels regular. She was treated, in the first instance, exclusively by means of the Spinal Ice-bag.

June 27th, 1868.—At this date the patient had been under treatment about six weeks; she menstruated a fortnight ago, with very little pain indeed; still had leucorrhœa. She said, "My head and eyes are much better," and she slept better. I requested the Spinal Ice-bag to be used as before, and prescribed Misturæ gentianæ, ℥j., ter die.

July 25th.—Had used the ice during an hour twice a day; was "unwell" two days a week previously; the flow was more copious, and the patient suffered much less pain than she had been accustomed to do; she had also less leucorrhœa. She stated that she had been *free* from headache for some time past, and repeated that she had better nights. Appetite much improved. I did not see this patient again.

CASE 42.—*Headache; Ovarian and Uterine Neuralgia; Backache; Giddiness; Deficient Menstruation; Excessively Frequent Micturition; Coldness of the Feet.*

August 22nd, 1868.—Ellen N., aged thirty-three, who had been married nine years, was troubled continually with the "whites," which had continued six years. She was "pretty regularly unwell, but there was scarcely anything at all,—scarcely a show, only a few spots." Her pain during her periods was so severe for twenty-four hours that she "could not sit or stand or do anything else." She had very severe headache, which continued all the day two or three times a week. She was very giddy, and had fallen "a time or two" in consequence; suffered much pain in the hollow of the back. The pain was sometimes so severe that she said, "When I sit down I can hardly get up again." She complained also of pain in the region of the left ovary, which was brought on by walking; bowels regular; micturition frequent and abundant; feet always very cold. She was treated solely by means of the Spinal Ice-bag and infusion of cinchona.

August 29th.—The patient was already much better. The pain in the back and the giddiness were lessened; the leucorrhœa too.

September 12th.—The headache and giddiness were nearly gone. During the previous few days micturition had not been so frequent. "I feel better like in myself," she said, "and more cheerful than I have done."

October 3rd.—The leucorrhœa had almost ceased ; the pain in the back quite so. She had felt headache but once during the previous fortnight, and then very slightly. There had been no recurrence of giddiness ; bowels regular ; pain in the region of the ovary quite gone. Treatment discontinued.

CASE 43.—*Painful Excitability of the Spinal Cord ; Headache ; Sickness ; Hæmatemesis ; Pain in the Left Eye ; Unduly frequent Micturition ; Coldness of the Lower Extremities.*

October 23, 1868.—I was consulted by a lady, aged about thirty-five, who was suffering in a preeminent degree from what I have called 'painful excitability of the spinal cord:' she complained of aching in the spine, most marked between the shoulders, and often ascending to the head, causing headache, face-ache, especially in the nose, also pain in the eyes ; when the pain was very severe indeed it descended, affecting the waist and hips, and extended even to the knees ; this was followed by retching and sickness—often during an hour at a time, and after being sick a day she always vomited blood, not in large gushes, but in quantities sufficient to redden completely the whole of the ejected matter. The patient had these very severe attacks with sickness two or three times in the year, but suffered from back-ache, off and on, during all the cold months ; sometimes if she walked out on a cold day she was attacked with an extremely acute pain, like to that produced by a hot iron, and with cramps, starting from between the scapulæ and extending to the head, which for a short time she could not move ; she was generally free from headache except during the attacks mentioned, but was peculiarly liable to great pain in the left eye. Chest always healthy ; tongue clean ; appetite small and rather feeble ; bowels prone to constipation—never opened above three or four times a week ; menstruation normal. The patient asserted that the smallest dose of calomel would induce it at any time : the Spinal Ice-bag did so when used, and I may add, used successfully, for stopping sea-sickness. Urination was very frequent during an attack—sometimes every quarter of an hour—at other times she was not troubled at all in this respect. Hands and feet always "stone cold" in winter ; she could scarcely make them warm at all. Pulse 80—very feeble. Slept very badly ; was usually awake a dozen times during the night, and felt very weary in the morning. Long before she had pain in the back she used to suffer much from sickness and vomiting of blood, beginning nine years ago. Two or three grains of quinine in phosphoric acid generally benefited her temporarily. She had

taken bromide of potassium during a month, but she could not bear it; she said it made her wretched: she could neither write, add up figures, nor remember peoples' names when under its influence.

I treated this patient with ice only, and at the end of a week after prescribing for her I saw her again. She reported that the application of the Ice-bag speedily made her warm all over, but that it also caused a throbbing headache with flushed face. At first, fearing that the ice would make her cold, she sat near the fire whilst using it, but soon found it needless to do so, and having put on the bag when her feet were extremely cold, they became quite warm within half-an-hour.

November 13th, 1868.—The patient generally continued wonderfully warm, and became so, when walking, much more readily than formerly. On the last occasion menstruation came on ten days before the regular time. Usually she had much pain during her periods, and the flow lasted four days; on this occasion she was free from pain, and the flow lasted six days.

Nov. 20th.—On the 15th she had no ice and suffered extremely from "neuralgic pain" shooting up and down the spine, and from headache. On the 16th she applied ice and it caused a recurrence of the sanguineous discharge both in the morning and the afternoon. The patient was attacked with influenza, and being treated by the medical attendant of her family she ceased of course to follow my directions.

December 2nd, she applied to me again (by letter). She wrote as follows: "I have now a great deal of spinal pain from between the shoulders into my head, and also neuralgia in my teeth, brow, and ears at times; I have very sleepless nights, and sharp pains round my waist after eating; I have, when that pain has become very intense, three or four times been sick, usually this is at night. . . . Dr. —— says I must have patience with the sickness, but I should like to try ice first, if you think I may, although I am afraid of trying it without your sanction." I prescribed the application of ice over flannel along the upper two-thirds of the spine, and simultaneously the application of an 8-inch Water-bag, containing water at 115° F. to the lower third of the spine during fifteen or twenty minutes twice a day; also the application of ice in the same manner at any time whenever the patient became sick, and on those occasions, and those only, without using heat at the same time; I also prescribed, beberiæ sulphatis, gr. ii½, ter die.

December 31st, 1868.—The patient reported as follows: On the 4th she began to take the pills as directed. On the 6th she had a violent spasm or cramp in the hypogastric region lasting from seven to nine p.m., when it became less severe but kept her

awake all night; she became sick with the pain, and was frequently so during the night. The next day she applied ice as I had directed, and continued to do so during a week using it only when she was especially sick. She began to menstruate three weeks and two days from the beginning of her previous period which had come on before the end of three weeks from the beginning of the preceding one. The catamenia continued a week, whereas they formerly lasted but four days, and recurred only once a month. She said that the ice always seemed to do her good, that it was always pleasant, and that she both looked better and eat her food better after using it; she was sure her spine had become less tender in consequence of the use of the ice, but she had "become dreadfully cold again after leaving it off." I advised that the treatment last prescribed should, with some slight modification, be persisted in.

January 16th, 1869.—She continued the use of the ice until this date, but left off the use of heat four or five days previously. She had had two attacks of "spasms;" had had more pain along the lower part of the back and down to the knees; also more pain when "poorly;" and her appetite was feeble; on the other hand she was assured that the ice stopped the sickness, made the upper part of the back less tender, and conduced to sleep. Moreover, the feeling which she used to have as of a red-hot iron up the spine which fixed the neck and left marked tenderness for two or three days after it came on, and the nervous headaches which also formerly troubled her had gone quite away since she had used the ice.

Comment.—Unfortunately I never saw this patient again. Her favourable and unfavourable experiences of the effects of the treatment adopted testify with peculiar emphasis to the greatness of its power and to the truth of the general doctrine forming the basis of Neuro-dynamic medicine. Within a week from the time the treatment began the patient who had habitually suffered from being cold had become warm all over. It is stated, Nov. 13, that whereas usually she had much pain during her catamenial periods, the first which occurred after she began to use the Spinal Ice-bag was without pain; and the last time I saw her she reported that the ice stopped her sickness, lessened the tenderness of her spine, and abolished both her "nervous headaches," and the terrible feeling "as of a red-hot iron" up her spine. On the other hand, the ice as first applied caused "a throbbing headache with flushed face," a very unsatisfactory result it must be admitted, but one which ought to be impressively instructive to both the physiologist and physician. Claude Bernard's experiment on the cervical sympathetic was here virtually repeated, his conclusion concerning its

function being decisively confirmed—but happily without recourse to vivisection. To the physician the result in question might suggest the idea that inasmuch as in this case the cerebral circulation was increased by applying ice to the spine, the large group of brain disorders the proximate cause of which is cerebral anæmia or insufficient nourishment of the brain-tissue may be most successfully treated by the Neuro-dynamic method. Again, though in this case it was difficult to obtain the advantages derivable from the use of the Spinal Ice-bag, because it induced the catamenia with undue frequency and unduly long continuance the production of these remarkable effects ought surely to deepen the insight of the physiologist respecting the nature of the relation between the nervous system and the menstrual function, and to give the physician an unspeakably important practical lesson in the treatment of uterine disorders, especially those forming the dysmenorrhœal group by the remedial method in question. I prescribed the sulphate of beberia, and the application of heat along the lower third of the spine, in order to lessen the frequency and duration of the catamenia, and to check the action of the ice in increasing them : the patient reported, Dec. 31, that the catamenial interval had lengthened again. She also reported that having left off the ice during the previous ten days she had become dreadfully cold again ; and that subsequently having resumed its use *together with the application of heat along the lower third of the spinal cord*, she had more pain again when poorly, and more pain *along the lower part of the back and down to the knees*—results capable of being produced by heat thus applied and thoroughly accordant with the doctrine, forming the basis of the treatment which these cases exemplify.

The patient was nominally under my care during only three months, and during portions of that time the treatment I prescribed was not practised ; in the course of those three months I saw her only six times. The gravity of her case and the remarkable susceptibility of her nervous system to the influence of both heat and cold when applied to the spine made it almost indispensably necessary that she should be under my immediate care in London so that I could see her almost daily and could thus be enabled to modify the treatment adopted as I might have judged expedient according to the successive indications of the rapidly changing symptoms. In a case in which even the smallest dose of calomel induced the catamenia, and in which moderate doses of bromide of potassium disabled the patient from writing, adding up figures, and remembering peoples' names, the effects of the Neuro-dynamic treatment, which, precisely because it is pre-eminently powerful for good, can, if misused, easily do harm, needed constant and intelligent watching, so that the maximum of good with the

minimum of harm might be secured during its application. But the patient found it cost the least effort to submit herself to the ordinary treatment by means of drugs prescribed by the physician in her immediate neighbourhood, and I understood that her malady increased so seriously that at length she lapsed into unconsciousness which continued a considerable time, and that she is still unable to leave her couch.

CASE 44.—*Prolonged Headache; Suppression of the Menses.*

October 24th, 1868.—Harriet W., aged seventeen, complained that she got wet three months previously about the time of her "period." She did not become "unwell," and had not menstruated since. She had suffered from headache during the previous four months. Her head was hot, and she slept very heavily; her bowels were open daily; she did not suffer from cold feet. Pulse 108. I prescribed the application of the Lumbar Ice-bag, until the ice should be melted, twice a day. No medicine.

Oct. 31st.—She began to apply ice on the 25th, when she applied it once, and repeated the application once on the 27th and 29th. The patient worked until ten o'clock at night, and could not use the ice oftener than she had done: she said it made her back feel very cold, and also made her feel very heavy and sick. She applied the ice on the 29th at ten p.m., and began to menstruate at noon the next day, and was continuing to do so when she called upon me. I had previously given her aloes and arsenic in succession without effect.

Nov. 14th.—Had not been able to use ice at all since I last saw her, but had continued free from headache, and in other respects quite well. Menstruation continued until the end of November 2nd.

CASE 45.—*Habitual Headache; Giddiness; Backache; Uterine Neuralgia; Pains, Weakness, and Coldness of the Feet; Deficient Catamenia.*

January 9th, 1869.—Harriet T., aged twenty-four, complained of pain between the shoulders, and in the lower part of the back. The whole spine was very tender on pressure, especially over the first and second and the eleventh and twelfth dorsal spines. She suffered from shortness of breath when going up-hill or up-stairs; she felt giddy two or three times a week, and had headache constantly; menstruation only lasted two days; she suffered a great deal of pain all the time, as well as a day before menstruation

began. During her "period," the pains in the head and lumbar region were much increased; she suffered from weakness and pain over the tops of the insteps; had no cough; tongue clean; appetite rather feeble; feet cold, I ordered ice to be applied along the lower third of the spine, sixty minutes, twice a day.

Jan. 16th.—The pain in the back was much lessened. The patient felt much stronger, and said,—"My breath is not so short as it was." "I have only had one of those giddy sensations in the head, and this week have had no headache." Pain in the insteps lessened, and feet much warmer. Requested to increase the application of ice to ninety minutes, twice a day.

Jan. 23rd.—The patient began to menstruate on the morning of the 20th inst., and felt no pain. The weakness and pain in the insteps were quite gone; the feet were very warm; she considered herself quite cured. However, I advised her to continue the treatment a week or two longer; but I did not see her again.

CASE 46.—*Pains and Swelling of the Feet; Great Difficulty in Walking.*

Jan. 14th, 1869.—Wm. B., aged twenty-five, complained of pain in both feet, "just as if blood was rushing into them." The right ankle was swollen on the inner side, and the joint felt loose, he said. He walked with great difficulty, and when walking he had pain along the soles of both feet, as if they were affected with rheumatic or gouty inflammation; also when walking he oscillated laterally, as if balancing himself. These symptoms made their appearance for the first time about eight months previously. When he stood he had a feeling of tightness, "as if something was drawing the soles of the feet together, and wanted to be expanded." Walking to his business, a distance of one mile, took him from forty-five to sixty minutes.

When the patient was ten years old he received a blow behind his ear, which was followed by partial (nearly complete) blindness of both eyes, "caused by a film over his eyes," as he said. The sight of the right eye was still defective. The bowels were regular, and the feet were generally warm; no spinal tenderness. I ordered ice to be applied to the dorso-lumbar region for two hours twice a day.

Jan. 20th.—The patient walked much better; he could stand longer without feeling pain, and could use his feet more quickly. He had not had the feeling as if the blood were rushing into them. The swelling in the right ankle was much lessened. The treatment previously ordered was continued.

Jan. 27th.—His power of walking had greatly increased. His

right foot was very much more flexible, and he felt himself, on the whole, very much better. He was requested to continue the treatment as before.

Feb. 10th.—The patient walked into my consulting-room without any lameness. He was then able to go to his business in twenty-five minutes. I advised him still to continue the ice as before, to have the right foot vigorously rubbed, and to take Potassii bromidii, gr. vij.; Infusi. calumbæ, ℥ss., bis die.

Feb. 24th.—The swelling of the right foot was quite gone; he could walk to business in twenty-two minutes; he was able to lift and carry things, which he was not able to do before. The patient reported himself "another man," in every respect. However, I advised him to continue the use of ice some time longer; but I did not see him again.

CASE 47.—*Headache; Pain between the Shoulders and in the Chest; Cough and Copious Expectoration; Shortness of Breath; Suppression of the Catamenia; Coldness of the Feet.*

February 2nd, 1869.—Ann S., aged twenty-eight, complained of "pain in the chest," and in her back between the shoulders: she had suffered thus for about three months; she coughed very much, and expectorated copiously; she generally had headache, especially during the last few weeks before I first saw her; she had not menstruated for four months. A remarkable feature in this case was that she had no leucorrhœa. Her bowels were open daily; she suffered much from coldness of the feet, especially during the previous two months; going up-stairs tired her very much. I ordered ice to be applied to the lumbar region in the upper cell only of the Lumbar Ice-bag, sixty minutes, three times a day.

Feb. 7th.—The patient began to menstruate on the 6th of February; she had no headache, and said, "I feel much stronger; my breath is much easier." The feet had been much warmer during the previous three or four days. She was requested to continue the use of the Spinal Ice-bag during the catamenial period.

Feb. 10th.—The ice had caused her no inconvenience whatever, but the flow ceased on Sunday. The patient said, "I feel almost as if I were quite well." I advised her to continue the ice as before, and to take ferri et quinæ citratis, gr. v., and Olei morrhuæ, ℥ij., bis die.

April 24th.—The patient began to menstruate on the 20th, and continued to do so four days without pain of any kind. She was well in all respects, and the treatment was discontinued.

Case 48.—*Thoracic Neuralgia.*

April 10th, 1869.—Catharine W., aged forty-five, married, suffered from thoracic neuralgia, which had continued uninterruptedly for three weeks. Even during each night the pain was always present, so that, except when, overpowered with exhaustion, she had dozed a little, the pain, she declared, had never left her. It was chiefly on the left side, below the left mamma, and extending backward to the spine; but it also shifted to the right side, extending upwards under the blade-bone. She said the pain was just as if she "was taking a penknife and jobbing it in the bone." On each side the character of the pain was the same. About seven years previously she was in Bartholomew's Hospital fifteen weeks with similar symptoms. She was told at the hospital she was suffering from pleurisy, and was cupped, leeched, and blistered. She was five weeks before she got any relief at all, and having got gradually better she left the hospital. The leeching, blistering, and cupping was all within the first week. I ordered ice to be applied forty-five minutes along the whole spine three times a day. During the first application the pain subsided entirely, but recurred about thirty minutes after the bag was removed. The pain recurred very slightly after the second application, and scarcely at all after the third.

April 14th.—I ordered the bag to be used ninety minutes. This was done daily four times, and no pain whatever was felt after the first of these applications.

April 17th.—The woman brought back the bag with overwhelming expressions of thankfulness for the cure of her malady.

Case 49.—*Headache; Pain in the Chest and Side; Retching and Vomiting; Constipation of the Bowels.*

April 17th, 1869.—Annie H., aged twenty-four, complained of pain in the head, chest, and side; of retching and vomiting—everything she ate causing her to be sick; and of constipated bowels. Her menses during the last five months had been extremely scanty, "a mere show." I treated her exclusively by means of ice.

June 12th.—She had used the ice, as ordered, regularly. The pains and sickness were quite gone; the patient said she had not been sick at all during the last month, and that her bowels had become regular; she had menstruated twice freely, "the second time abundantly." She reported herself quite well, and therefore ceased to attend at the Dispensary.

CASE 50.—*Prolonged Headache; Infra-mammary Neuralgia; Heavy and Unrefreshing Sleep; Cough; Deficient Catamenia; Coldness of the Feet.*

June 12th, 1869.—Elisabeth H., aged twenty, consulted me, when she complained of almost continuous headache, of pain beneath her left breast, and of a dry cough. Her menses were very deficient, and had always been so; but they recurred regularly. During their recurrence her headache was much increased: it was most severe during the early part of the day. She slept very heavily, and felt as sleepy in the mornings as if she had not been to bed. I prescribed the application of the Lumbar Ice-bag in the lumbar region, twice a day, until the ice should be melted, and infusi calumbæ, ℥j., twice a day.

I did not see the patient again until May 11th, 1872, when she informed me, that by acting on my advice in 1869, she was completely freed from all pain, and had become thoroughly well.

CASE 51.—*Intense Pain of Several Years' Duration in the Lumbar Region.*

June 16th, 1869.—Mrs. W., aged twenty-seven, complained of intense pain across the hollow of her back. It had troubled her during several years, and had increased in severity, especially during the preceding four months. There was very great tenderness of the lower dorsal and of the lumbar spine.

She was treated exclusively by means of the Lumbar Ice-bag, and on June the 30th—after the lapse of only fourteen days—she assured me that the pain was completely annulled, and that her back was wonderfully strengthened.

CASE 52.—*Headache; Ocular and Intercostal Neuralgia; Backache; Incontinence of Urine.*

July 11th, 1869.—Mary M'C., aged twenty-nine, came to me a few months previously complaining of pain in the head and across the eyes, also of extreme pain in different parts of the walls of the chest—especially below the left mamma—and in the lumbar region. Suffered much from incontinence of urine. She was treated solely by means of the Spinal Ice-bag.

The patient said that she found herself generally improved under the ice treatment adopted according to my directions, espe-

cially in respect to increase of circulation, denoted by increased warmth. She said, "I am natural now; I was not natural before, I was so cold: the least thing makes me warm now."

July 2nd, 1870.—The patient stated that she continued the treatment advised for several months after I last saw her—in fact, until she felt she needed it no more. The incontinence of urine had quite ceased in about four months. The eyes were much better; and she experienced no pain in the chest, mamma, or lumbar region.

CASE 53.—*Headache; Giddiness; Severe Pain in the Hollow of the Back; Great Tenderness along the Spine; Violent Cough; Constipation of the Bowels; Leucorrhœa; Abnormally Frequent Micturition.*

July 18th, 1869.—Jane J., aged twenty, married four months previously, complained of extreme pain in the hollow of the back. It was felt daily, but much worse during menstruation, when she had horrible pain in the back generally, increasing sometimes to an intense paroxysm, which lasted about five hours. There was great tenderness along the dorsal and lumbar spines. Pressure on the dorsal spine caused a peculiar and most distressing pain at the middle of the sternum, and affected her breathing. She complained also of giddiness and pain in the head, which had frequently caused her to reel. After sleeping, "I wake up," she said, "so dreadfully giddy;" she slept soundly, except that frequently, though not every night, she was seized with a violent cough, which lasted from a few minutes to two hours, and caused her a distressing "dragging" at the base of the chest: she expectorated freely afterwards. Pulse, 100; bowels "very confined." Urinated very often at times, and "sometimes I'm quite different," she said. Suffered from leucorrhœa "of a bad kind," which had troubled her for years, but which increased appreciably before menstruation; indeed, the menstrual discharge seemed to consist in great part of leucorrhœa. She was very weak, and could scarcely stand.

I advised her to apply ice along the lower two-thirds of the spine during an hour three times a day, and to take aperient pills occasionally.

September 14th.—The patient continued the use of the ice twice a day during a month, and afterwards about once a day during a fortnight. The pain in the back gradually lessened: "I felt," she said, "different in a week, but very different in a fortnight," and at the end of "about a month I had lost the pain altogether," except during menstruation. She had then a little pain,

"very little—it only just came on now and then." The giddiness had quite ceased, and the headache had lessened "very much." The violent cough, dragging, &c., at the bottom of the chest were "entirely gone." No expectoration. The spine could be forcibly percussed without causing pain, and the peculiar sensation at the bottom of the sternum could not be reproduced. Her bowels had become "nicely regular," and she made water with normal frequency—not more than once or twice a day. The leucorrhœa was much lessened, and much less offensive than it was before treatment. The patient felt altogether "much better—much stronger." She was about leaving London for Hertfordshire, and the treatment was discontinued.

CASE 54.—*Headache Continued from Childhood; Infra-mammary and Uterine Neuralgia; Backache; Deficient Menstruation; Prolonged Leucorrhœa; Slight Cough and Hæmoptysis; Constipation of the Bowels.*

July 21st, 1869.—Susan P., aged twenty, complained of headache, to which she had been always subject as long as she could remember. It occurred generally every day, and was worst in the afternoon. Suffered pain below the mammæ, which had troubled her at frequent intervals during the previous two months; had also very much pain in the hollow of the back, which was relieved by pressure on it; had a slight cough, and spat blood twice the previous week; had always—since she was thirteen years of age—suffered from dysmenorrhœa with great pain; the flow lasted about two days, but was very scanty; had suffered from leucorrhœa for a long period *constantly;* bowels constipated. I prescribed the use of the Lumbar Ice-bag, and Ammonii chloridi, gr. vij.; inf. calumb., ℥ ss., ter die.

August 11th.—The patient said she had used ice regularly as directed; her headache was much lessened; she had passed several days without it; the infra-mammary pain and cough had quite gone, and she had had no hæmoptysis since she commenced applying ice; the pain in the hollow of the back was scarcely felt; the bowels were still constipated, but less so than before I saw her. After using the ice a few days she became unwell; the pain was very much lessened, and the flow was increased, and lasted four days; she wore the ice during the whole period; the leucorrhœa was also much lessened.

September 22nd.—The patient found the application of the ice rather pleasant than otherwise. She said, "The headache is a great deal better; I scarcely have it at all now. I've been three or four days at a time quite clear of it." The pain in the hollow of her

back was "quite gone." The bowels had become open daily. The menses, which had recurred the previous week, continued three days, and were considerably more copious than formerly. During the previous fortnight she had had no leucorrhœa at all.

October 26th.—There was again a marked improvement: she was better in all respects. At this date I advised her to use the ice once daily, and to take Ol. morrhuæ, ℥ij., bis die; also Ferri et quinæ citratis, gr. v., bis die.

February 15th, 1870.—The patient reported herself well in all respects: she looked so, and had become thoroughly rosy. Treatment was therefore discontinued.

CASE 55.—*Neuralgia of the Head, Face, and Shoulders; Excessive Constipation of the Bowels.*

October 2nd, 1869.—Mrs. S. suffered from neuralgia, which was chiefly in the left side of the head and face, and which continued for about the half of each day. It generally came on in the morning. She said, "At the corner of my left eye there seems something drawing; then it goes into my right eye, and down to my shoulders." During the attacks the left eye shed tears freely. Her mother said, "sometimes she had seen her turn very white." The least excitement, or a very warm place, brought on an attack. She did not suffer from headache. Bowels very much constipated; menses regular; feet warm; pulse 100; tongue clean. She was treated solely by means of the Spinal Ice-bag.

October 13th.—The attacks were much slighter; the pain did not extend to the shoulder; and there was no lachrymation. All her symptoms were strikingly lessened.

October 20th.—The pain came on only for two or three minutes daily, and was much lessened in intensity. Bowels less constipated, but still rather confined.

November 20th.—The patient had been quite free from pain during the previous ten days, and, November 13th, the treatment was discontinued.

CASE 56.—*Severe Facial Neuralgia; Headache; Abnormally Frequent Micturition; Excessive Coldness of the Feet; Great Tenderness of the Spine.*

H. B., aged thirty-two, bookbinder, suffering from severe facial neuralgia, consulted me October 19th, 1869. The pain was chiefly felt in the lower jaw and region of the ear, sometimes on one side, sometimes on the other, and recurred daily. The patient

never passed twenty-four hours without an attack, and each attack lasted about five hours. His fellow workmen observed that during his attacks his face had a pasty aspect, and that afterwards it was sometimes swollen. He found that exposure of the painful side of the face to external cold gave relief. When the attacks awoke him up in the night he wholly lost his night's rest. The disease began about ten months previously. During the first three months it came on with notable regularity each evening when the gas was lighted in the work-room, which became much hotter in consequence. The pain usually continued till about 12 p.m.; subsequently, it ceased to have a distinctly periodic character, but the attacks became increasingly severe. He also often suffered from headache. Pressure on the spine of the atlas produced sharp pain. Marked tenderness was also evinced when pressure was made along the lower half of the spine: pressure on the seventh dorsal spine caused the patient to feel as if his breath were stopped; pressure on the upper lumbar was especially painful, on the intervening spines less so.

The patient rose four or five times each night to pass water; and ever since he could remember he had suffered from great coldness of the feet. The tongue was fairly clean; bowels regular; pulse 64, rather feeble, but steady. His urine deposited a sediment, which, he said, "furs the chamber pot." He had been treated at King's College Hospital, chiefly, he believed, by means of quinine and iron internally, and belladonna to the face, but without benefit. He afterwards obtained some slight but only temporary relief by taking chloride of ammonium, prescribed for him at the Farringdon Dispensary. He had had two teeth drawn in the hope of being relieved from his misery, but without avail.

I advised the application of the upper cell of a 22-inch Spinal Ice-bag along the lower third of the spine during an hour and a quarter twice a day.

October 22nd.—The patient reported himself better: the attacks had become less violent, and he had not risen at all during the night to make water since he had used the Spinal Ice-bag. I then prescribed the application of the upper two cells of it along the lower two-thirds of the spine, till the ice should be melted, twice a day.

October 29th.—The patient said, "I'm a great deal better: there seems a subdued pain, but as if something was struggling with it to keep it down. The pain is there, but it feels as if it were dying away,—like the fag end of a pain. It comes on just about the same time now as it did at first; but it's really so slight now, that I scarcely take any note of it. Last Saturday [six days previously] it was very bad from two in the morning till nine at night; since then, I've scarcely been troubled at all." On that

day no ice was applied till night. I again advised the application of the Spinal Ice-bag as before, till the ice should be melted, twice a day.

November 5th.—Had had scarcely any pain at all; had only felt, in the front of the ear, slight jumping pains, lasting a few seconds, and recurring at twilight; had lost his headaches entirely; his urine had deposited no sediment since the third day of using the Spinal Ice-bag; made water only two or three times a day, and not at all at night; said that, so far as his general health was concerned, he never was better in his life. I advised him to persist in the treatment last prescribed.

November 19th.—Had had only one attack of pain since last visit, and then, by applying the Spinal Ice-bag, he caused it to vanish within ten minutes. The tenderness of the spine, especially over the first cervical vertebra, was wonderfully lessened; the feet were "immensely warmer." He now began to apply the Spinal Ice-bag at night only. I advised him to continue it to the lower two-thirds of the spine as before, but only during an hour; and then to apply it across the first cervical spine till the ice should be melted.

December 3rd.—He continued free from his malady "except," he said, "about twice a day I may feel two little ticks, lasting about a second each, not more—quiet beats, not painful," at the original seat of pain. The application of ice twice across the occiput made him feel sick. He was again requested to restrict the Spinal Ice-bag to the lower two-thirds of the spine, continuing its use each night till the ice should be melted.

January 18th, 1870.—Had continued free from pain while continuing to use the Spinal Ice-bag; but he said, "I find that if I don't use it the pain comes back. During three days at Christmas I went without ice altogether, and the pain became dreadful. I find that I can go over one day without using the bag, or two at a push, but I can't extend it to three." He was requested to continue the treatment as before.

May 3rd, 1870.—Had been free from pain during three months, and enabled to dispense with the Spinal Ice-bag during about ten weeks; but at length the pain returned on the left side of the face. He therefore resumed the use of the Spinal Ice-bag April 28th, and had had no pain until the morning, when he called upon me. He had had no ice the previous night. I requested him to apply the upper two cells of the Spinal Ice-bag to the lower two-thirds of the spine each night till the ice should be melted, and prescribed the following:—Ammonii chloridi, ℥iij.; aquæ camphoræ, ℥xij.; capiat., ℥ss., ter die.

May 24th, 1871.—He reported that he applied the ice as ordered during seven days, that after the third day the neuralgia ceased, and that it had never returned.

CASE 57.—*Temporary but Frequently Recurring Blindness followed by Intense Headache, and associated with Hyperæmia of the Retina.*

One of the most instructive and decisive proofs of the possibility of increasing or decreasing the peripheral circulation by modifying the temperature of the spinal region consists in the effects which may be thus produced on the circulation within the eye. I have obtained this proof and have been able, in several instances to improve vision by acting on the spine; and Mr. Ernest Hart, whose especial devotion to diseases of the eye renders his observations of the effects in question the more valuable, has experienced the truth of my assertion. He treated the case I am now about to describe, but as he did not publish it, it seems desirable that I should do so. The patient is the cousin and was under the care of a medical man by whom he was taken to Mr. Hart, and who both gave me an outline of the case and sent the patient himself to me. The following account I wrote down, Oct. 30th, 1869, from the patient's own lips:—

J. S., aged fifty, was attacked quite five years previously with a peculiar kind of temporary blindness, which continued until he was treated as hereafter described. A sort of mist came over his eyes in such a way that he could see only parts of objects—the parts seen became gradually less, until at length he could see "a mere nothing of them." Then the sight began to be gradually recovered; the parts of objects seen became gradually larger until he could see the whole—a perfectly dense mist however being left during from thirty to sixty minutes on the right side. The attacks occupied about thirty minutes coming on, and about the same time going off; both eyes were affected in the same way. The attacks were not preceded but were *always* followed by an extreme headache, almost incapacitating the patient from doing anything, and generally lasting from ten to twelve hours. The blindness recurred two or three times a week at least, but sometimes two or three times a day; in the latter case several days might elapse before another attack occurred; the patient suffered to this degree of severity during about two years. From childhood he had been especially liable to headache and rarely passed a week without it; his father suffered in this respect in the same way.

He had had much advice and had taken a great deal of medicine without benefit; he was at length taken to Mr. Ernest Hart, who treated him during several months by means of drugs, and also requested him to take freely of cream-cheese and clotted cream, but without any avail. I understood that Mr. Hart, as

well as other oculists who had seen the patient, stated that there was congestion of the retinal blood-vessels; at all events, after he had found that the treatment just mentioned did no good, he ordered the application to the cilio-spinal region of a 10-inch Spinal Water-bag containing warm water twice a day, each application being continued during half-an-hour. In the course of the first week during which heat was thus applied, the attacks were wonderfully subdued in respect both to frequency and severity, and at the end of about a month they had almost wholly ceased. The bag was applied a few weeks longer and then was left off altogether, and the patient continued free of attacks during nearly six months, and then only one was experienced. In about six months afterwards two more followed, and since then until the time when the patient called upon me—a period of twelve months—he had had no attack whatever. His headaches since the use of the Spinal Water-bag had been, he said, "comparatively nothing to what they used to be." His general health at the date of the report was very good indeed.

CASE 58.—*Fits of Agonizing Pain in the Chest and Abdomen; Neuralgia in the Right Shoulder and in various other parts of the Body; Extreme General Weakness, Emaciation, and Coldness; Excruciating Tenderness of the Spine; Arrested Growth.*

November 29th, 1869, I was consulted concerning M. C., a girl, aged twelve, who was afflicted with fits of intensely agonizing pains, chiefly in the chest, and sometimes in the abdomen, causing her to bend herself double, and to utter piercing screams which were often heard across the street. It was not clear from the description of the attacks whether the body was bent forwards voluntarily or involuntarily; her mother thought it was to ease the pain, but sometimes the patient was bent forcibly backwards. She never lost consciousness. Each attack lasted from twenty minutes to two or every three hours. The attacks recurred with terrible frequency. Latterly she had also complained of pain in the right shoulder, and of flying pains attacking in succession almost every part of the body. The child was extremely weak, pallid and emaciated, and was so exhausted as to be unable to walk more than a few steps. Though twelve years old, she did not look more than about six in respect to stature, but her mental expression denoted the experience of an adult. She did not suffer from headache, was intelligent, and able to read. When free from pain she slept fairly well. The lower extremities, from the knees downward, were habitually very cold. Pressure on the

second cervical and on the fifth lumbar spine caused immediate and excruciating pain. The child had been an out-patient at the Royal Free Hospital, and an in-patient both at University College Hospital and at the Children's Hospital in Great Ormond Street.

I requested the patient's mother to clothe her down to the wrists and ankles in thick flannel; to apply a 16-inch Spinal Ice-bag along the whole spine, during twenty minutes three times daily, and to give Olei morrhuæ, ℥j., Ferri et quinæ citratis., gr. iij, bis die.

December 18.—The child had had only two attacks since the treatment began, and both were much slighter than usual. Her appetite was wonderfully improved, and her mother thought that the second attack had been brought on by eating salt beef. She was warmer, heavier, and altogether better and more cheerful, and she was able to walk and play about every day. The treatment already prescribed was continued.

January 8th, 1870.—She had had no further attack; her legs and arms had become very warm. Her mother volunteered the remark that she needed less clothing at night; she ran about in the street, and this morning had walked nearly a mile. Sleep very good; tongue clean; appetite very satisfactory; bowels regular. I now requested the Spinal Ice-bag to be applied along the whole spine forty-five minutes twice a day. Medicines as before.

April 2nd.—The Spinal Ice-bag had been left off during a week, owing to a misunderstanding of my instructions, and during that week the patient had had three attacks; but since the use of the bag had been resumed, she had had none, and this morning she walked into my room, seemingly quite well. She looked plump and fresh, her cheeks having a clear rosy hue. I requested her mother to continue the ice as before but to stop the use of medicines.

June 11th.—The patient had had no attack. Her mother said "she has had no pain or ache whatever, in any shape or form." She had become wonderfully strong and walked about with perfect ease; she had a capital appetite; she slept well, and her bowels were open each morning. However, I advised the mother to continue the ice once daily if possible, and to give the child change of air.

In June, 1872, the patient was brought to me by her mother, who informed me that the child had had no relapse, and had continued strong and well. She looked thoroughly well, but continued of remarkably diminutive stature. The progress of this remarkable case was witnessed by Miss Firth, who is well known as a practitioner of midwifery, and who sent the patient to me in the first instance.

CASE 59.—*Headache; Pain in the Instep; Extremely Severe Uterine Neuralgia; Irregular and very Deficient Catamenia; Feeble Appetite; Indigestion; Flatulence; Vomiting; General Feebleness, Emaciation, and Coldness.*

Miss W. S., aged seventeen, who was first seen by me Nov. 21, 1869, began to menstruate two years and a half previously. The function had continued to recur, but at periods both irregular and abnormally far apart; six weeks often intervened, not unfrequently a longer time, and on one occasion the catamenial interval extended to four months. During her periods she suffered fearfully: throughout the first day she was in one continuous agony, which kept her, to use her mothers' expressive phrase, "rolled up in a ball;" the second and third days she suffered less and could move about. Her mother said, "the pain is so severe that though she is not given to crying she is constrained to cry." During the first day she also suffered from "spasms" and sickness. She had continuous nausea, and if she ate anything it was vomited immediately. She was liable to headache, chiefly in the mornings; she was much troubled with indigestion, feeble appetite, flatulence, and excessive constipation. Her constitution was remarkably feeble, and she spoke habitually in a low voice as if she had not sufficient expiratory force to sustain a conversation at the ordinary pitch; she was very thin, and her extremities were remarkably cold; "in fact," her mother said, "I might say they are never warm;" she suffered from childhood in both hands and feet from chilblains. About eight years previously she strained her instep, and it seemingly got quite well; "for years," her mother said, "I never heard of it;" but during the two years immediately before I saw her she had complained of the recurrence of the pain whenever her indigestion was worse than usual. The pain sometimes lasted for several days during which she was unable to walk at all. The lungs were healthy, except that at the base of the left lung the respiration was wavy and defective. There was no tenderness but marked curvature of the spine in the dorso-lumbar region, the convexity of the largest curve being leftwards. Pulse 90—very feeble.

The treatment of this case, which was chiefly by means of ice, and which was continued during several months under my personal superintendence needed, owing to the extreme delicacy of the patient, great and constant care. Along with the use of ice I prescribed iron, cod-liver oil, a course of gentle gymnastics under a skilled master, and regular systematic singing. The result proved thoroughly satisfactory. Already at the end of a

fortnight from the time when the treatment began, she was generally stronger and better, and remarked as a proof of her improvement, "I feel as if I could sit up straight." Her indigestion and flatulence were lessened; her bowels had become open daily; she reported herself warmer, though still disposed to be cold; the chilblains which had troubled her in November had disappeared; so also had the pain in the instep; and the breathing had become as clear and equable at the base of the left lung as it was in that of the right, indeed in both it had become clearer and more distinct. Gradually all her troubles subsided; her digestive power became normal; she ceased to be sick or to feel nausea at her "periods;" her bowels acted daily; she lost her headaches; the catamenia recurred monthly, copiously, and without any pain at all; she became generally warmer and stronger; and, in fact, at the end of four months, when my treatment of her ceased, her constitution had become wonderfully renovated.

CASE 60.—*Pain in the Right Temple, at the Back and Base of the Head, between the Shoulders, and across the Loins; Uterine Neuralgia, accompanied with Retching and Diarrhœa; Retarded, Intermittent, and very Deficient Catamenia; Profuse Leucorrhœa; Coldness of the Feet.*

January 13th, 1870.—Mrs. R., aged twenty-nine, complained of severe pains right across her loins, and between her shoulders. The former scarcely ever ceased, and were much the most intense at night. She suffered also from excessive pain at the back and base of the brain. This pain was induced by any ordinary noise, as well as by her own laughing or singing. She had often pain, too, in the right temple. Each menstrual period was preluded during about a week by a great increase of the lumbar pain, and by pain in the womb. "About the day before" the flow began diarrhœa set in, accompanied with pains, which, she said, almost drew her double; and sometimes during her periods she suffered from prolonged retching.

Appetite "very bad indeed;" bowels "pretty regular," but more confined than formerly; was troubled with profuse leucorrhœa, which had lasted several years; the menses recurred about every fifth week, and lasted, "on and off," less than two days; the flow was intermittent: she said,—"Sometimes I rise out of bed in the morning and see something, and then see no more all day." The discharge was so slight that she needed only one napkin during her period. She suffered "very much" from coldness of the feet: her husband couldn't bear to feel her feet at night. Prior to her

marriage, ten years previously, she menstruated copiously, and enjoyed thoroughly good health. Had a child nine years previously; none since. Pulse 64. She was treated exclusively by means of the Spinal Ice-bag and infusion of calumba.

Jan. 25th.—The pains across the loins and between the shoulders had quite ceased; had still a little pain beneath the shoulder-blade; the pain at the base of the brain was less violent, and that in the temple was less frequent; the leucorrhœa was much lessened; appetite improved; bowels "relaxed this two or three days."

March 18th, 1870.—The pains across the loins and between the shoulders had never returned; the pain in the back and base of the head had also ceased; the pain in the right temple recurred very rarely; leucorrhœa "very much lessened;" menstruated to the day at the end of a month last time, but the flow was not perceptibly increased. It was not preluded by any pain in the back; the pain in the womb was much lessened; she had no diarrhœa, and did not retch at all. The feet had become quite warm; appetite much improved; bowels quite regular. Treatment discontinued.

CASE 61.—*Facial Neuralgia; Inadequate Sleep; Coldness of the Feet.*

Mrs. B., aged twenty-seven, who consulted me by letter Jan. 14th, 1870, suffered from trigeminal neuralgia, the left side of the head and face being chiefly affected, and the left eye and cheek-bone most especially; sometimes, and often suddenly, the pain left the left cheek and occupied the right. The pain, which was extremely severe, and prevented the patient from sleeping, was most violent from ten p.m. till three a.m. The pain first came on in March, 1868; it continued during some months, and left her after the hot weather set in; it returned about Christmas of the same year, troubled her more or less during the winter, and again left her in the summer. Her bowels had a tendency to be costive, and she "suffered greatly from cold feet." Catamenia normal. She had several decayed teeth.

I prescribed the application of the eight-inch Spinal Water-bag—temperature 115° F.—to the cilio-spinal region each night when the attack was about to come on, and at other times whenever she felt any warning of impending pain. In January, 1871, her husband informed me that "the application of the bag generally soothed the pain," and that that winter, "for the first time for three winters," there had been "only slight premonitory twinges, which had not come to any head." I never saw the patient, and prescribed for her, by letter, but once.

CASE 62.—*Headache; Backache; Ovarian Neuralgia; Gradual and Complete Cessation of the Catamenia; Profuse Leucorrhœa; Habitual Coldness of the Feet.*

Feb. 12th, 1870.—Mrs. F., aged twenty-five, complained of great and persistent pain in the lumbar region, and in the right hypogastric region; she also suffered from headache—at the vertex, from frequent sickness, and profuse leucorrhœa; had not menstruated during the previous three months. Before her marriage, seven years previously, her menses were copious, and without pain; since that event they had gradually lessened in quantity and duration, and had been accompanied with intense pain: latterly, they generally lasted only one day—never more than two—and during the whole period she suffered acutely. Since their cessation three months ago her general health has become increasingly impaired, and the ovarian pain has become especially distressing. Appetite "very bad;" tongue fairly clean; pulse feeble; feet habitually very cold. She was treated exclusively by the Neuro-dynamic method—no drug being given.

Feb. 18th, 1870.—Pain in the back and in the right ovary lessened; leucorrhœa lessened; sickness lessened; appetite improved. The use of the ice had caused no discomfort.

March 30th.—The pain in the lumbar region had quite ceased; the ovarian pain was scarcely felt; headache and sickness quite gone; leucorrhœa had become so slight that she said,—"It's nothing to speak of now." Felt decidedly warm all over. Appetite greatly improved. Treatment discontinued.

CASE 63.—*Neuralgia of the Ears and Face; Headache; Feeble Appetite; Deficient Catamenia; Leucorrhœa; Coldness of the Feet.*

April 21st, 1870.—Mrs. C., aged forty-six, applied to me when suffering from unceasing pain in the head—"all over it." The ears and teeth were extremely painful: the pain in them seemed to correspond, she said, with that of the head. The pain had lasted five or six months, and was so horribly severe at night that she often walked about the room, being unable to rest in bed. She said, "I get about a quarter of an hour's sleep, and then lie awake nearly all night." The appetite was "very bad;" but the bowels were regular. She had menstruated very slightly three weeks previously; and during the previous six months the flow had been very deficient. Before that period it was copious. She suffered very much from coldness of the feet, and had been troubled with

leucorrhœa during the last two or three years. Pulse 80. She had pleurisy, and was nine weeks in hospital a year before she consulted me. She was treated by means of the Spinal Ice-bag until the end of May, no medicine being given. She improved steadily, and some time before that date had become quite free from both neuralgia and headache.

June 18th—nearly three weeks after the treatment had been discontinued—the patient had had no return of pain of any kind; her appetite was improved; the catamenia had become more copious, and, respecting her leucorrhœa, she said it was "nothing compared with what it was" before she came under my care. Referring to the general effect of the treatment, she remarked, "It's done me a wonderful deal of good."

CASE 64.—*Intense Headache; Infra-mammary, Ovarian, and Uterine Neuralgia; Severe Backache; Giddiness; Retarded and Deficient Catamenia; Profuse Leucorrhœa; Varicose Veins; Great Coldness of the Feet.*

June 18th, 1870.—Ann C., aged eighteen, domestic servant, complained of pain in the left breast, in the left ovarian region, and in the lower part of the back: she had been troubled in this way during about eight months; she added, "And I suffer to stupefaction in the back part of my head;" she often felt giddy; menstruated about two days, and very slightly, at intervals of five, six, and seven weeks; had extremely severe menstrual pains, lasting about forty-eight hours; leucorrhœa very profuse, and increasingly so during the previous nine months; the veins at the upper and inner side of the calf were in an extremely varicose condition, and the leg was often very painful; her feet were markedly cold. She was treated solely by the Neuro-dynamic method.

June 28th.—The pain in the breast had gone, and the backache had much lessened. She said, "I've not seen none scarcely of them whites since I've used the ice. My leg is not so painful as it was. My feet are very hot,—just as if they were inside of an oven."

July 5th.—The pain in the left breast had not recurred; that in the left ovary had quite ceased. She only felt the pain in the back now when she awoke in the morning. The pain in the back of the head and the giddiness were much lessened. Menstruation came on June 30th, and continued three days. She found that without the Spinal Ice-bag she had great pain; but that when she got up, replenished it with ice, and reapplied it, it gave her immediate and great relief. The leucorrhœa had quite ceased.

June 27th.—Was quite free from pain. Had menstruated again much more copiously, and after a shorter interval than formerly. The menstrual pain lasted during one night only; but she was sure that if she could have got ice she should have had no pain, because at the previous period the ice immediately stopped the pain. The leucorrhœa had not returned. The treatment was discontinued at this date because she was so much better, and because, as she confessed, she was unable to pay for more ice.

CASE 65.—*Violent Headache; Intense Cutaneous Irritation; Sickness; Drum-belly; Profuse Leucorrhœa; Prolapsus Uteri; Swelling of the Lower Extremities; Prolonged Absence of Perspiration.*

Mrs. B., aged forty-eight, consulted me June 20th, 1870, when suffering from a copious erythematous eruption (*erythema papulatum*) diffused over her face, neck, arms, and hands; she also complained of violent headache, and of retching and vomiting, which were especially troublesome each morning. When nine years old she was attacked by a dog, and was extremely frightened; she seemed to lose all her strength, became speechless for a time, and, when she recovered her power of speech, she was unable to speak without stuttering until about three years after her fright. About six or seven days after it she suffered from an eruption like that which troubled her when she consulted me. Ever since the first attack she had had, on an average, two attacks of the same disorder each year. "Before each attack I seem," she said, "to sicken for it three or four weeks, and I have headache—a kind of swimming or dizziness, often taking away my eyesight, and making me almost delirious." She frequently experienced, she said, a sudden stiffness in her limbs during the same preliminary period. She declared that she never perspired, and that so far as she could remember she never had since the period of her fright, however hot the weather might be. She added that when she got over-heated her skin burnt in an indescribable way, making her feel as if she ought to be bled, and that afterwards it cracked in those places which had been most troublesome, as if it had been inflamed. This statement was confirmed by her sister, whom I also saw when the patient first consulted me. She complained, too, that her abdomen was habitually and largely swollen, and that this disorder distressed her greatly. She had suffered from leucorrhœa for many years: her business compelled her to stand during the greater part of each day, and the discharge was so profuse that it saturated her stockings, and often

compelled her even to change her boots. She menstruated regularly, and with but little pain. She suffered from habitual prolapsus uteri, the mouth of the womb often protruding through the os vaginæ. Aching in the back and a distressing sense of bearing down were incessant; she was also much troubled with swelling of the legs every day. I ordered the application of ice along the whole spine during sixty minutes three times a day—the morning application being continued during and after her breakfast, which, on many previous mornings, she had vomited.

June 21st, 8 p.m.—The patient reported:—"No sooner had I applied the ice than the itching ceased almost instantaneously, and the soreness [of the parts where the rash had broken out] ceased with the itching—both ceased. The ice was very comfortable—quite refreshing." It was applied on the first occasion in the evening. The patient slept well, though the night was extremely hot. She awoke heated and irritable; "but," she said, "as soon as I put the Ice-bag on again the itching ceased directly, as quick as I am telling you. Before dinner I drank some stout, which brought the itching on again, and immediately I applied the ice the irritation ceased. This evening I had no irritation whatever, but reapplied the bag, because I thought I ought, and should like to do so again." Not only had the irritation and soreness ceased, but quite two-thirds of the eruption had faded away. The patient said, "The relief I felt from the ice I can't describe." She had the ice on during breakfast, dinner, and tea, and reported,—"I had no sickness whatever—not the least of it." She was extremely astonished to find that she had had no leucorrhœa to-day: she said, "I have never kept so clean and comfortable during any day for eleven years past." I ordered the Spinal Ice-bag to be continued as before during an hour three times a day.

June 22nd, 8.30 p.m.—The patient had felt no itching since that caused by the stout yesterday. Last night she took both beer and wine. She had "a very comfortable night, and woke this morning full of energy." She was still quite free from both sickness and headache. She said that had her present attack been allowed to continue during the hot weather then prevailing, she knew, from previous experience, that without the ice she would have been half delirious, and that having had a very bustling, anxious day, she would have been obliged to go to bed. With the exception of a little swelling over the left malar bone, there was scarcely a trace of the eruption left. The leucorrhœa had quite stopped; and the swelling of her legs, which, as she said, had been an every-day experience, had not occurred during the previous two days. She was perspiring freely, and in consequence was feeling, she said, "unspeakable relief." The sweat was gently diffused all over her; the bearing-down was lessened.

June 23rd, 8 p.m.—The eruption was wholly gone, and the patient had remained free from discomfort of all kinds; she had observed on her linen only one spot of leucorrhœal discharge; and she continued in gentle perspiration. I requested the ice to be applied only twice daily, morning and evening.

June 27th, 9 p.m.—The patient continued free from leucorrhœa till the previous day, Sunday; then, having no ice, she could not use the Spinal Ice-bag, and then the discharge recurred in almost full force. She applied the ice to-day as ordered, and to-night she said that since the first application to-day she had had scarcely a trace of the discharge; she was still free from sickness and head ache, and the "bearing-down was much lessened." The treatment previously prescribed was continued.

July 4th.—The patient reported herself quite well. The skin was clear, and her complexion and general aspect were much improved. She said, "I feel different,—I can't describe it; I feel more light-hearted; I feel that I can do anything; I perspire nicely, and the bearing-down has ceased."

July 23rd.—She had continued well in all respects, except that during the previous five mornings she had observed a slight sanguineous stain on her linen, just as if she were beginning to menstruate. Her abdomen was now so reduced that she was quite proud of her improved appearance. She had no "bearing-down whatever;" the swelling of the legs had not recurred, and she continued to perspire freely. Throughout the period of treatment the bowels had acted daily.

July 29th.—The slight sanguineous discharge had quite ceased. The patient said that, in consequence of the state of her womb before I began to treat her, she could not lift any heavy weight, but that now she could do so with ease, and that she was altogether much stronger than she had been for many years before. During the five weeks of treatment I prescribed no medicine whatever.

Comment.—This was the first case of an erythematous eruption which I had treated, and probably the first that had been treated by means of the Spinal Ice-bag. Holding the views I have elsewhere expressed concerning the part played by the nervous system in the process of textural nutrition generally, and therefore in the nutrition of the skin, I was prepared for the result recorded; indeed, it was because I anticipated it that I eagerly persuaded the patient to allow me to treat her as I have described.

The cessation of the chronic swelling of the lower extremities recorded in this case may, perhaps, be accounted for by saying that when the general health of the nervous system was improved, its influence over the textural nutrition, and therefore over the

systemic capillary circulation was sure to be improved also. I offer this suggestion as a provisional explanation, which seems to be satisfactory, but which increasing knowledge may, of course, prove to be incorrect.

The most remarkable phenomenon in this remarkable case was, however, in my opinion, the production of perspiration by the use of the Spinal Ice-bag. I call this phenomenon the most remarkable because, as a general rule, while heat along the spine tends to promote perspiration, ice tends to stop it. I explain the production of perspiration by means of heat along the spine by assuming that what I call the "positive motor nerves," presiding over the sweat-glands, are, by the influence of the heat, rendered additionally active; but, of course, this assumption involves another, viz., that cold to the spine operates in the contrary way, and as a matter of fact it generally does so. But here is a case in which ice along the spine caused a person who, during many years, had suffered much from the want of perspiration, to perspire freely. How is this? I can offer no explanation with confidence that it is correct. To me the phenomenon remains as mysterious as it is interesting, and shows how much we have yet to learn of the nature of the relation between the nervous system and the processes of secretion, especially the process of perspiration. It has, however, seemed to me possible that since the fright and shock sustained by the patient, the delicate muscular tunic of the blood-vessels supplying the sweat-glands, or it may be of the ducts of those glands, had remained in a condition of chronic spasm, and that the effect of the ice, by abolishing the morbid irritation of the vaso-motor nerve centres, consisted in releasing that muscular tunic from the influence of that irritation, and thus in allowing it to assume that state of healthy dilatation which is a necessary condition of normal perspiration. I must add, however, that this is not the only case in which perspiration has been produced by the use of ice, but it is the only case, so far as I know, in which the patient was previously suffering from a burning skin. Of course, in cases in which the skin, before treatment, is markedly anæmic and cold, owing to vigorous contraction of its blood-vessels generally, ice to the spine, by putting a stop to that contraction, will cause the sweat-glands, as well as the other parts of the skin, to be supplied with blood, and will thus make the skin warm, and re-establish perspiration at the same time.

CASE 65A.—*Violent Headache; Cutaneous Irritation, with Eruption; Sickness; Leucorrhœa; Prolapsus Uteri.*

Mrs. B., the patient whose case is described in the immediately preceding narrative, came to me again in April, 1872, and stated that she was suffering from an eruption like to that of which she complained when she first came to me. She was also suffering in like manner as before, from intense headache, sickness, leucorrhœa, and prolapsus uteri. The eruption was chiefly confined to her face, the exposed part of her neck, her arms and hands—on the latter the elevations were studded together much the most closely. The accompanying irritation was scarcely as troublesome as it had been on the occasion when she formerly consulted me. Her headache during the onset of the eruption was so peculiarly intense that she feared to come to me lest she should fall on the way. She stated that she had as a rule remained, during the period since her previous attack, quite free from both leucorrhœa and the bearing-down of the womb, but that if at any time either or both of them came on, she resumed the use of the Spinal Ice-bag, it proved as completely effectual in remedying them as it did when she first applied it.

On this occasion I asked Dr. Liveing to see the patient with me, and then requested her to apply the Ice-bag along the whole spine four times a day, and to meet us two days afterwards at his house, so that we might see the result. We saw her, and to my surprise found the eruption in much the same state as it was in before the Spinal Ice-bag was applied. On inquiry, I ascertained that it had not been applied at all along the most important part, viz., the cervical spine, but only along the dorsal and lumbar regions. The continuance of the eruption in the same state as before, and of the itching which she complained of was thus, as it seemed, fully accounted for. She was then carefully instructed to apply the ice thoroughly to the cervical region, and especially to allow the air, which accumulates at the top of the bag, to escape from time to time, so as to permit the ice to be applied closely to the spine. Having duly fulfilled these injunctions, she presented herself to us the following morning, and reported that, as last applied, the Spinal Ice-bag had again quickly allayed the cutaneous irritation, and that she felt in all respects better. The eruption itself was also rapidly declining, and, the treatment being continued, soon completely disappeared. Owing to the presence of leucorrhœa and prolapsus uteri, the Spinal Ice-bag was used about three weeks, twice a day, after the eruption had ceased, and at the end of that time both those maladies had quite ceased also.

CASE 66.—*Great Pain and Sense of Pressure in the Head; Extreme Drowsiness; Intercostal Neuralgia; Gastralgia; Severe Menstrual Pain; Retarded and Profuse Menstruation; Leucorrhœa; Coldness of the Feet.*

Amelia R., aged twenty-nine, a cook, came to me December 14th, 1870, complaining of pain over the surface of the left wall of the thorax: the pain was not stationary, but moved about, and was intermittent. When she moved her head quickly, or looked up suddenly, she also felt a dull pain at the pit of the stomach; and a somewhat similar pain was produced below the left mamma each time I pressed on the lower dorsal spine. She also suffered every day from a sense of pressure and great pain at the top and back of the head, with a feeling of extreme drowsiness. She menstruated every sixth or seventh week profusely, and with great pain in the hypogastric region: this she had suffered from during many years. She was troubled with leucorrhœa occasionally; and her feet were often very cold. She had been treated by three medical men in succession without being benefited. I advised her to apply ice along the entire spine sixty minutes each night.

Dec. 29th.—She reported that she had not felt at all for some days any of the pains she complained of December 14th: she could now move her head in any direction without causing pain; even pressure on the spinous processes would not cause pain below the left mamma, as at the previous date; pain and pressure in the head had completely gone. She began to menstruate on the 24th inst., which was only a month after the previous period. She said—"I had very little pain—I don't know whether it is because I used the ice, but I don't know when I've had so little pain." She was quite sure she had had much less leucorrhœa since using the ice; and said,—"I feel much better, in all respects, and stronger." I now requested her to apply the ice, in one cell only of the Spinal Ice-bag, to the dorso-lumbar region each evening, and to take ol. morrhuæ, ℥ij., b. d., also ferri et quinæ cit., gr. v.; aq., ℥ss., b. d.

Jan. 5th, 1871.—The patient declared she had felt no neuralgia whatever during the previous fortnight. "In fact," she said, "I feel quite well, with the exception of this pain in my chest"—a slight pain at the apex of the left lung. I requested her to continue the ice to the lower third of spine, and the medicine as before.

Jan. 12th.—Reported herself quite free from pain, and well in all respects; she was stouter and stronger, and quite cheerful, whereas formerly she suffered from depression of spirits.

Jan. 26th.—Began to menstruate exactly at the end of four weeks from the beginning of her previous period. The total amount of the flow had lessened; she felt well in all respects.

She said,—"It's astonishing how much stronger I've got—not for the last two years have I been so strong as during the last six weeks." Treatment being no longer necessary was discontinued at this date.

Case 67.—*General Neuralgia with Total Suppression of the Catamenia during Eleven Years.*

Mrs. ——, aged forty-one, whom I saw for the first time, Jan. 16, 1871, was suffering from general neuralgia: she said, "It's over every nerve in my body, I can't express it in any other way." The chief seats of pain were around the ears, now on one side now on the other; along each of the four extremities—though rarely at the same time; in the right side; and along the back. The pain in the back was at once the most agonizing, and the most continuous. The pains generally consisted of a long succession of intense and quickly recurring paroxysms with more or less severe aching during the intervals; sometimes when a paroxysm came on while she was walking she felt as if she must fall and was obliged to get into a cab immediately; she felt, she said, as if the flesh were being torn from the bone. After she came under my care I had frequent opportunities of witnessing her suffering which she bore with wondrous heroism: she wrestled most determinately with her enemy which seemed as if intent on forcing from her a cry of agony which, as a rule, she resolutely suppressed; but sometimes, in spite of her, the tears suddenly started from her eyes, and occasionally an audible expression of pain when extraordinarily sudden and acute escaped her. By no effort of her will, however, could she prevent the spasmodic and quivering movements of her limbs which accompanied and revealed her sufferings. Indeed, the voluntary motor nerve centres had become largely involved in the disorder which affected her, a fact proving at once how extensively the disease had become rooted in the spinal cord and how difficult would be its eradication. The hands and ankles, and sometimes the face, swelled when the pain was more especially concentrated upon them. If she played the piano the hands swelled almost immediately; she was therefore obliged to give up playing altogether. When the head and face were painful there was often considerable lachrymation, and, also, secretion from the nasal mucous membrane. She was generally free from headache, and though almost all her teeth were carious she never suffered from toothache. Her chest was healthy. The appetite was extremely feeble, and sickness was easily induced. The bowels were prone to be constipated; and she suffered "very much" from flatulence, most so at night when she swelled

very much. She had not been troubled with leucorrhœa during the preceding six years. The menses had been completely suppressed during the preceding eleven years. She suffered much from coldness of the lower extremities, the knees as well as the feet being particularly cold. Her tongue was fairly clean, and her pulse, which was 80 per minute, was very steady. I was rather surprised to find that her spine was especially tender on pressure only in the lower dorsal region.

She had her first child when she was twenty-four years old, and her second when she was thirty, or eleven years before I first saw her. A year or two before the birth of the second child she suffered from neuralgic earache, and during her second pregnancy she was troubled with neuralgia of the limbs. About three months after the birth of the child she began to feel *very severe* pain in the dorso-lumbar region, so severe that on one occasion it seemed to paralyse her, and she had to be carried to her bed from a carriage in which she was riding; the pain continued with terrific severity for three days during which she kept her bed. A few weeks afterwards she was attacked with severe pains in her legs. After this period pain recurred at intervals of a week or of several weeks sometimes in one part of the body, sometimes in another. During the ten years before she consulted me she had rarely passed more than a few hours, and never more than a few days without pain which moved from one part of the body to another, but which was always especially severe when it attacked her back and limbs. Her sufferings had reached their maximum severity six years before I saw her, and continued with the brief intervals of respite already mentioned until that time. She menstruated quite regularly and naturally before she conceived the second time, and she suckled the child—although the quantity of milk was insufficient; but on the occasion of the severe attack when she was carried from the carriage to her bed she was advised to cease suckling; she did so, and from that time she had never menstruated again. She had no pain in the pelvis, and neither any displacement nor any organic disease of the womb could be discovered. She was formerly remarkably well nourished and quite plump; but during the five or six years before I saw her she had steadily decreased in flesh and had become extremely thin; the muscles of her extremities were extraordinarily attenuated.

Notwithstanding all this suffering her constitution was really so little impaired that when she was freed from pain for only a few hours she seemed to recover at a bound her wontedly high spirits, and even her physical vigour so as to be able to walk several miles.

She had had the utmost help which medicine could give, and

every variety of treatment which could be suggested by the several medical men who had attended her. Prussic acid, Indian hemp, arsenic, strychnia, belladonna internally and externally, subcutaneous injections of morphia, galvanism, the actual cautery applied along the spine twenty-five different times, leeches applied to the womb six times, and the waters of Harrogate and of Aix-la-Chapelle, besides various other remedies had all been tried and had proved of no real avail. Such being the case a merely palliative treatment chiefly by means of opium and alcohol was finally resorted to, and I was assured by the patient that for about three years immediately before I saw her such sleep as she had had each night had been obtained by the help of some narcotic agent—generally laudanum.

She came to London for the express purpose of submitting to my treatment which was continued from the date of her arrival, Jan. 16, until the middle of May, 1871, when she returned home. The use of narcotics, and of stimulants (excepting a glass of beer with her food or a small quantity of wine occasionally) was rigorously withheld. The active treatment consisted mainly in the regular application of ice to some part or to the whole of the spine as from time to time having regard to the changing symptoms, I thought most expedient; a systematic and prolonged use of warm baths; and the administration of various medicines which I thought might co-operate to achieve the end in view. Galvanism (the continuous current) was also used for a short time, but proved of no real service.

The being deprived of narcotics, and of alcohol (except in the limited quantities just mentioned) was felt by the patient at first as a great trial, which, however, the systematic use of the Spinal Ice-bag rendered tolerable; she soon began to sleep without their aid, and before many weeks had elapsed she slept normally throughout each night—often during six, seven, or even eight hours—sometimes even without waking once. As a general rule, liable, however, of course, to exceptions, this habit, after being re-acquired, continued while the patient remained under my immediate care.

The pains she suffered gradually became less severe: she ceased to have pain in her back March 2nd, and became free from pain in all parts in the middle of May.

The menstrual function was re-established April 22nd; and, having ceased suddenly immediately after I galvanized the face, neck, and upper part of the spine in the evening of that day, recurred during the daytime of the 24th.

The patient's appetite was thoroughly restored, and she gained flesh to an extent equally gratifying and surprising. She told me, May 13th, that her cousin, who had not seen her since she came to London, visited her on that day, and that he exclaimed

"How stout you've become! I should not have known you. How wonderfully better you are looking!" And her husband, when he came to fetch her home, remarked, "I don't remember her at any time to have had so good an appetite as she has now." He also said, "Certainly, I don't think she has had so much flesh on her as she has at present for five or six years past." Moreover, after their return home he wrote me a thoroughly satisfactory report of her.

But soon after she was settled at home she began to suffer again severely, though she was still able to say, "My nights are VERY good." She returned to London in August, and again came under my personal care. She did not progress so rapidly on this as on the former occasion; but she improved greatly: she generally slept well, she recovered much of the good condition she had when she left London in May, and in December she passed many days either entirely free, or almost entirely free, from pain. The menses continued to recur, and at nearly normal intervals; on the last two occasions of which I have notes they recurred on the 29th of October, and again on the 19th of November, so that three weeks elapsed between the periods of their recurrence. On the last occasion they continued five days, and were especially copious and of thoroughly healthy colour.

It was decided that she should again return home; but before the date fixed for her return arrived, she had a sudden relapse: her pleasing and healthy expression of countenance changed, her face appeared dark and congested, and her sufferings became very severe again. Indeed, the change was so rapid and so great that I could not help thinking it must have originated in some mental trouble. She went home at the time appointed, and I regret to say that when I heard from her last she was still suffering (to what extent I do not know), notwithstanding that the menstrual function has been thoroughly re-established.

Comment.—This case presents some remarkable and peculiarly instructive features. Although the menses had been wholly suppressed during eleven years, the patient suffered rarely, if ever, from headache; although both her jaws were full of decaying teeth—most of them mere stumps, some of which had abscesses at their roots—she never suffered from tooth-ache; and although she had long suffered excruciating pains in the back, together with suppression of the menses, she had not been troubled at all during the five or six years before she consulted me by leucorrhœa. Seeing the state of her teeth, I thought it probable that, though she felt no pain then, they produced a great amount of irritation of the nervous system, and thus favoured the continuance, if they did not cause, her neuralgia; accordingly, I advised their extraction when she came under my care the second time.

But though she said she experienced a feeling of relief of a kind she could scarcely describe, and, after being supplied with artificial teeth, could masticate her food far more thoroughly than before, the improvement effected in her mouth exerted no appreciable influence in lessening her neuralgic sufferings. Again, the long suppression of the catamenia might fairly have been regarded as an adequate proximate cause of those sufferings, and yet the complete re-establishment of the menstrual flow which I anxiously sought to effect failed to put an end to them, although it undoubtedly conduced to lessen them, as well as to improve the general health of the patient.

It seems to me that the facts of this case forcibly illustrate the truth which I have elsewhere insisted on,—that when a morbid condition of the nervous centres has been induced, and has persisted a considerable time, that condition is apt to become established in the organisation as a *habit*, and, as such, is likely to remain even after the complete removal of the cause which originally gave rise to it. Whether in this case the carious state of the teeth and the suppression of the menses operated jointly or separately as causes of the neuralgia, or whether it was due to some other cause, it is manifest that the disease was so wrought into the nervous centres as to have become, as it were, "a second nature" obstinately persisting after its seemingly probable causes had been removed; and that, having assumed an independent existence, it needed, after their removal, long and patient battling with in order to effect its thorough destruction. This consideration made me regret that when, on the first occasion, it was thoroughly subdued but not yet destroyed, the patient returned home in May, 1871 : had the treatment and *régime* then practised been vigorously persisted in under my personal superintendence during a few months longer, the neuralgic habit of twelve years' duration might, I think, have been abolished; but the patient's return home so speedily after it had been subdued enabled it to acquire a new lease of life, and when she returned to me a great part of the battle, which had already been fought successfully, had to be fought over again. And on the second occasion I experienced a similar disappointment.

But notwithstanding the absence of complete and permanent success in this remarkable case, the experience of the efficacy of Neuro-dynamic medicine which it afforded is very striking and instructive : the terrific pains which had tormented the patient during a long series of years were wonderfully subdued ; she was enabled to dispense with those previously necessary evils—narcotic medicines—and to have from six to eight hours of healthy, refreshing sleep almost every night ; and her menstrual function, after eleven years of total suppression, was completely re-established.

CASE 68.—*Headache; Hypogastric Neuralgia; Suppression of the Catamenia; Faintness; Leucorrhœa; Coldness of the Feet.*

February 4th, 1871.—Miss G., aged twenty-six, single, complained of headache, lasting several days together, and of frequently recurring and severe pain in the hypogastrum. She was also liable to sudden attacks of "faintness," when her face became pallid. She had menstruated since the previous November. She suffered from remarkable coldness of her feet; her hands were clammy, and she was wont to feel cold generally. Tongue fairly clean; appetite feeble; bowels regular. Pulse 82.

During three or four years before her catamenia were suppressed altogether they were very deficient—only two napkins being needful at each period; and *on each occasion she suffered intense pain in the forehead, and in the lower part of the back during four or five days.* I prescribed the application of the Lumbar Ice-bag to the dorso-lumbar region during an hour three times a day. No medicine.

March 6th.—Her headache had lessened, and her hypogastric pain had quite ceased; the leucorrhœa had also ceased. Her feet had become warm, and she slept much better than she did before using the ice. Pulse 87. She was now requested to apply ice in each cell of a twenty-inch Spinal Ice-bag along the whole spine each morning, and in the upper two cells of the same bag along the lower two-thirds of the spine each afternoon and evening during ninety minutes. ℞ Infusi calumbæ, ℥j., bis die.

April 3rd.—The headache ceased early in March, and, after recurring slightly on the 18th and 19th, had not been felt again. Her appetite had improved. She was requested to continue the ice as before. ℞ Olei Jecoris, ℥ij., bis die.

May 1st.—Had continued free from headache until this date, and felt better, she said, after each application of the ice. She was requested to continue it and the cod-liver oil as before. ℞ Pilulæ aloes et ferri, gr. v., omni nocte.

May 22nd.—Menstruation began on the 19th, and continued till the night of the 21st. The discharge was of normal colour, and more copious than formerly—four napkins being necessary. *During this period she had pain neither in the back nor in the womb.* Prescription same as before.

July 2nd.—An intimate friend of the patient called to inform me that she was in every respect quite well, and would have called herself had she not been obliged to go out of town in order to make arrangements respecting her coming marriage.

CASE 69.—*Painful Excitability of the Spinal Cord; Headache; Facial, Cervical, and Uterine Neuralgia; Nausea and Vomiting; Diarrhœa; Leucorrhœa; Deficient and Intermittent Catamenia; Coldness of the Feet.*

Miss T., aged twenty-five, who consulted me 27th February, 1871, was suffering from excessive excitability of the whole spinal cord. She had measles when fifteen years old, and since that time she had been troubled with neuralgia of the right temple and along the neck. It had been increasing in frequency, and, for full six months before she came to me she had suffered every night from the pain. Generally it did not begin till she went to bed, but if she was very tired it began earlier: it lasted from two to four hours. She said,—"It seems to go back from my temple into my neck, and then it goes away." During the presence of the pain the affected parts were especially tender. She suffered from ordinary headache about once a week on an average; but at her catamenial periods it was very severe for two or three days successively. She had pain in the lower half of the spine, extending round to the left side of the abdomen, "more or less, nearly always," but it was greatly intensified at her catamenial periods. She had excessively severe pain in the womb, as well as in the back, during two or three days at each period, which lasted from seven to ten days. The flow, however, was both intermittent and deficient. During each of her periods her stomach and bowels were extremely irritable: she felt nausea the whole time, if she ate anything she vomited immediately, and she was always troubled with diarrhœa. Her appetite was habitually very feeble; her bowels were generally rather relaxed; she was troubled with leucorrhœa during the whole of each catamenial interval "very much;" and her feet were almost invariably cold. Her power of walking was very slight: for a long time she could only walk a few yards at a time; latterly she had been able to walk during ten or twenty minutes, but not without feeling fatigue. Pulse 100. Pressure on the sixth and seventh cervical vertebræ caused agony, and pressure on every part of the spine was almost intolerable. I prescribed in the first instance heat along the upper and cold along the lower part of the spine, and afterwards the application of ice only.

March 10th, the patient had just passed through her menstrual period: she had had less pain, less sickness, and no diarrhœa; she was moreover able to eat, and to keep her food. The warm water bag made her feel sleepy. Pulse 80, soft and full.

March 27th.—She had continued the use of the Spinal Ice-bag

as prescribed, except during three days, when the ice was omitted. She said,—"I like the ice : it sends me to sleep, and, if applied when the neuralgia is bad it generally relieves it."

April 19th.—She reported herself very much better : she had been quite free from neuralgia about half the whole number of nights which had passed since her previous visit. Had again been "unwell," and again, was "not nearly so sick" as formerly. The use of the Spinal Ice-bag was continued throughout her period, and "comforted her," she said, "very much." The pain in her back had lessened, and her feet had become "decidedly warmer."

May 8th.—Had had no neuralgia at all for a week together—an experience she had not had for months before. Her headache had become less frequent. The back was still less painful, and had become stronger; she could walk better. During the preceding fortnight the bowels had been opened only once a day. The leucorrhœa had greatly lessened, and the increased warmth of her feet continued.

I regret that I did not see this patient again : she stayed in or near London while I treated her; but she was obliged to return to her home in the North of England immediately after I last saw her. I gave her such general instructions as seemed to me expedient concerning her further use of the Spinal Ice-bag; but what further progress she made towards complete recovery I never heard.

CASE 70.—*Headache; Singing in the Ears; Distressing Hyperæsthesia of the Right Hip; Neuralgia of the Testicles and Perinæum; Weakness and Emaciation of the Lower Extremities; Partial Impotency; Excessively Frequent Micturition; Constipation of the Bowels.*

William T., aged fifty-nine, came to me on March 1st, 1871, complaining of a distressing sensation immediately above one of his hips, "as if a plaster covering a raw surface were being torn off." He had also acute darting pain in the perineum and both testicles, especially when he was engaged in lifting any considerable weight. He urinated with excessive frequency ; and was obliged to get up three or four times each night to pass water. He said,—"I've pain all down my legs at times"—sometimes for several days together and becoming much worse at night. Complained also of violent pains in the head, and "singing in the ears" when he stooped. The legs and arms had become weaker and smaller than formerly : he could stand on each leg separately with difficulty.

Bowels constipated, except when he had recourse to aperients. Sexual power very much impaired. The patient was employed in an oil merchant's business, and had frequently to lift iron "drums" of oil amounting to 56 lbs. weight. Two years previously, when suddenly lifting one of these drums, he felt a "very, very acute pain like a crick" in the lumbar region of the spine, which caused a feeling of stiffness for a few minutes, and so incapacitated him generally that he was obliged to go home: he was disabled from work altogether during the week following. Previous to the accident the patient enjoyed good health in every respect—the bowels acting regularly each day.

The treatment in this case was solely by means of ice, and was continued only twenty-three days. At the end of that period, viz., March 25th, the patient reported that the sensation of soreness over the hip, and the pain in the perineum and testicles were *quite gone*. Urination much less frequent; during several nights previously he had not got up at all to make water. The pains and weakness in the limbs had ceased, "except perhaps a little bit of a twitch sometimes" when he lifted anything. He had had neither pain in the head nor singing in the ears since the end of the first week of treatment: he declared that he did his work as well as ever he did in his life, and walked home a mile to dinner, and a mile back again, whereas, before I saw him, he could not attempt it. He remarked,—"I feel altogether a different man. It is a very strange thing that such a cure can be made without any medicine." At this date the treatment was discontinued, as the patient said he felt no further necessity for it.

CASE 70A.—*Hyperæsthesia, associated with Small-pox.*

March 6, 1871.—Mrs. W., a young married lady, of fair complexion and considerable beauty, requested my advice. I found that she was suffering from small-pox, and that the eruption, the nature of which the patient had not recognised, had made its appearance three days previously. The whole body was covered with papules, which, however, were crowded together most thickly over the lower part of the trunk. The eruption in the face was so considerable that it was not possible to insert the top of the finger between the papules; and below the orbit on each side they were more or less confluent. There was considerable fever, very severe headache, intense irritation over the surface of the body, and the patient was extremely restless and excitable. The previous night she had been delirious.

On the 2nd of March the patient took a walk, and returned home shivering, and complaining generally of malaise—could eat

nothing, and went early to bed. The next morning she felt very sick, retched violently—though unable to vomit, and complained of very severe backache. On the following day, the 4th, there were superadded to these symptoms intense headache, and the first appearance of the eruption. The distress increased, and on Sunday, the 5th, the patient was excessively irritable and excited —could not be kept in bed, and towards evening became decidedly delirious; and on the following morning, as already mentioned, I saw her professionally for the first time. She was treated by means of the Spinal Ice-bag, which was applied differently at different times, according to the varying conditions of the patient's cerebral circulation.

The effect of the cold in subduing the itching of the papules was almost magical. If she felt irritation ever so intensely, and the ice were at that time applied, within five minutes afterwards the irritation ceased, and the patient was altogether soothed and calm. The effect, in fact, was so delightful to her that, as soon as the ice in the Spine bags had melted, she prayed that they might be immediately replenished. This as a general rule was done, and during the whole of six consecutive days, and the greater part of the corresponding nights, she lay on ice continuously. At the end of that time the energy of the disorder having been spent, and its incidental irritation having been proportionally lessened, the ice was applied less and less continuously, but was used daily during full five weeks altogether. Throughout her convalescence she found it so comforting and refreshing that she was unwilling to dispense with it.

Convalescence steadily proceeded without one untoward incident, and the disease which had inspired her with inexpressible dread lest it should permanently disfigure her, left no distinct trace of its presence. There were, indeed, for a time a few places in which, when the patient made any extra exertion, or expressed any strong mental emotion, hyperæmic or congestive spots appeared; but gradually these ceased to be observable, and finally the face seemed not to be marked at all, unless it were scrutinized very closely, when a few whitish spots very slightly pitted could be discovered on that part of the face where, when I first saw the patient, I observed the papules to be confluent.

The sedative influence exerted by the Spinal Ice-bag on the intensely itching papules was so remarkably powerful and decisive that my experience in this case alone compelled me to ask myself whether it is not probable that that influence may be used to retard their development, and actually to impede or arrest the march of the disease itself. A preparation of glycerine was in the first instance applied over the skin from time to time, and the

patient said it gave her momentary relief; but it was of no real avail in permanently lessening the irritation, and, as already mentioned, she would not rest during the first period of her illness unless the ice were being applied.

In connection with this case and the use of the Spinal Ice-bag, I may mention that during the early period of the patient's illness each of the three servants who were in the same house with her began to be troubled with a very pronounced "malaise," nausea, and vomiting, one of them being confined to her bed a whole day. I treated all three in the same manner, namely, by persistent application of ice along the spine. At the end of three days they were all fairly well again, and had no relapse.

CASE 70B.—*Hyperæsthesia, Delirium, and Sleeplessness, associated with Small-pox.*

During the convalescence of the patient whose case is numbered 70A, I was called in consultation concerning another case of small-pox. The patient, a literary gentleman, was far advanced in the disease when I at first saw him.

He was covered with papules, which were fully developed. He was violently delirious, and insisted upon walking incessantly about his room stark naked. His medical attendant had prescribed narcotics, which, however, had proved of no avail.

Having advised the discontinuance of drugs altogether, I applied a short Spinal Ice-bag along the lower half of the spine, and another across the occiput. In a few minutes the patient was fast asleep; I then advised that the ice should be continuously applied in like manner until the mental excitement should be thoroughly subdued, and then at intervals, gradually increasing in length. The patient was scarcely delirious at all after the first sleep produced by the ice, and during each succeeding night he slept several hours. The effect of the cold in subduing the excessive hyperæsthesia from which he suffered was not less remarkable than was that recorded in the case previously described.

The results of the Neuro-dynamic treatment of small-pox, which are exhibited in the foregoing cases, are so important that, on public grounds, I think it my duty to print the following letter from the patient whose case is numbered 70B :—

"DEAR DR. CHAPMAN,

"I have very great pleasure in bearing my testimony to the very satisfactory operation of the Spinal Ice-bag in mitigating the dangerous delirium, sleeplessness, and high fever

of small-pox. My own experience of the disease and of the remedy entitles me to speak.

"When you were called in, in March, 1871, to advise upon my case, I had been utterly exhausted by long-continued and violent delirium, based upon the most distressing and persistent delusions, and accompanied by restless impatience at confinement to bed, as well as by inability to obtain sleep. I had fruitlessly been sickened with opiates, and the alarming symptoms showed no signs of abatement when you were called in and prescribed the Ice-bag.

"I shall never forget the grateful and almost magical effect of the bag when first applied. It almost instantaneously produced a refreshing sleep, from which I woke with the delirium and the delusions gone, with a restful sense of repose, with no tendency to rave or to leave my bed, and with a general feeling of increased strength; subsequently the delirium slightly returned, but the Ice-bag in every instance produced sleep, and dispelled the delusions from which I suffered. During convalescence, whenever I felt weak or perceived my mind to be wandering, I called for the Ice-bag, always with the same beneficial result. I should add that the bag also acted with wonderful effect in cooling the temperature of the face, and in preventing the irritation from the pustules during their disappearance. If at any time I felt disposed to rub or scratch my face, I was able to combat the desire successfully by an application of the bag.

"You are at liberty to make any use you please of my testimony on this subject.

"I am, dear Dr. Chapman, yours very truly,

"E. D. J. Wilson."

Case 71.—*Severe Pain in the Dorso-lumbar Region; Chronic Cough; Headache.*

March 25th, 1871.—John H., aged forty-four, complained of severe pain in the dorso-lumbar region; he had suffered from it between three and four months: it was especially severe when he stooped at his work—that of a ladies' boot finisher. He had also a severe cough, and frequently a headache, which he thought was caused by its paroxysms. He always had a cough in the winter, but this year it had been "dreadful bad." I advised him to apply the upper cell of the Lumbar Ice-bag along the lumbar spines, until the ice should be melted, each night. ℞ Syrupi ferri iodidi, ℥j., bis die; Olei morrhuæ, ℥ij., bis die.

April 4th.—The pain in the back was almost wholly gone. He said,—"I feel a great deal better: I can now sit down to work a

few hours; I couldn't a fortnight ago because my head was so bad. If I stooped down I had giddiness." Appetite "wonderfully improved." Pulse 94. The cough was not improved after using the ice. I advised him to continue the same treatment as before.

May 23rd, 1871.—The pain in the back was quite gone, and, therefore, the treatment by means of the Spinal Ice-bag was discontinued.

CASE 72.—*Great Pain at the top of the Sacrum; Extreme Tenderness along the Dorso-lumbar Parts of the Spine; Sleeplessness; Vomiting.*

March 29th, 1871.—John B., aged thirty, complained of pain at the top of the sacrum. The pain was much increased by stooping, and was brought on seven days previously, when he strained himself by carrying an unusually heavy load: he said,—"The bag went over my head; it ricked me in the back, and I've been queer ever since. I can't sleep at all scarcely because of the pain." Since the accident he had vomited the greater part of each meal "a few minutes" after taking it. He felt worst when lying down, and vomited most in the mornings. The whole of the lower half of the spine was very tender—great pain being caused by pressure on it. I requested him to apply a twenty-four-inch Spinal Ice-bag along the whole spine, till the ice should be melted, three times a day.

April 8th, 1871.—He used the Spinal Ice-bag as ordered. At this date he had no pain whatever, and no sickness; he ate well, slept well, and in all respects felt quite well. The tenderness of the spine was completely gone. He said,—"I can stoop or do anything now, sir." Treatment discontinued.

CASE 73.—*Cutaneous Disease of the Right Side of the Neck and of both Hands, with Intense Hyperæsthesia; Great Tenderness along the whole of the Cervical Spines.*

April 24th, 1871.—Cecilia B., aged seventy, had a red eruption, slightly papulous, on the right side of the base of the neck, about twelve lines long by eight broad, which appeared about five weeks previously; it was extremely irritable, especially when she became warm. She had also a like patch, but larger, on the radial side of the back of the right hand, and a smaller one on the palm of the same hand. The latter was rough and desquamating. The ulnar

half of the palm, the base of the thenar eminence, and the whole of the anterior part of the wrist, and part of the dorsal surface on the radial side, were covered in like manner. These parts on the left hand appeared as if they were recovering from a burn; they were denuded of cuticle, were cracked, felt peculiarly tight, and were very red and glossy. She had not suffered pain in these parts—only intolerable "prickly itching," and a feeling of intense heat: she said,—"They are so hot—so burning hot." There was *great* tenderness of the whole of the cervical spines, pressure on the second caused most pain; and the structures on each side of the lower cervical spines were swollen and tender. Three months previously the patient cut her left wrist on the ulnar side, longitudinally; the wound was about two inches long, and was deep; it was made with a piece of a wine glass, which she broke while cleaning it. The wound healed in about a month: in about another month the disorder began near the wounded part with intense itching; it gradually spread, and three weeks ago appeared in the right hand. I requested the patient to apply ice along the whole cervical region ninety minutes three times a day.

May 1st.—The eruption on the neck was markedly lessened, and the irritation of the part had almost ceased. The patches on each hand had become very much smaller, and the irritation complained of was "wonderfully lessened." She had used ice only twice a day. She was requested to use it three times a day. I also prescribed an ounce of infusion of calumba to be taken twice a day, and an ointment of the acetate of lead to be applied to the hands twice a day.

May 9th.—The patch on the neck was all but gone; the hands were very much better—the redness had nearly disappeared; the dorsal surface of the left hand was quite well—that of the right hand nearly so. Treatment as before.

May 16th.—She had had no irritation whatever since I last saw her. The skin of the neck was well; but tenderness was evinced on pressure of the lower cervical vertebræ. The left hand looked well except that the skin, which was now pale, looked as if it had but recently, though completely, recovered from the effects of a burn. The dorsal surface of the right hand on the radial side was the least completely healed. I requested the ice to be continued as before, and prescribed ferri et quinæ cit., gr. v.; aquæ, ℥ss., bis die.

June 23rd.—The neck was quite well, and the patient felt no tenderness when considerable pressure was exerted on the cervical spine. The hands were quite well also, except a very slight roughness about the size of a shilling in the left palm. Treatment discontinued.

CASE 74.—*Headache, with distressing Heat at the Top of the Head; Pains in the Lower Extremities; Frequent Flushings, followed by general Coldness; Nausea and Vomiting; Insufficient Sleep; Coldness of the Feet.*

April 25th, 1871, Mrs. L., aged forty-eight, complained of "burning pain" at the top of her head, of pains in her lower limbs, of "burning-heats" which came over her, of sickness and sleeplessness. She had long been a frequent sufferer from ordinary headache, but the "burning-pain" at the top of the head, which she described as peculiarly distressing, she had suffered "almost daily" during about a month immediately before she came to me. The "burning-heats" began to distress her at frequent intervals about twelve months previously; about four months after they came on her catamenia ceased, and two months after their cessation her flushes or burning-heats, which had become very frequent, began to be followed by nausea, often also by vomiting, and afterwards by general coldness. These extremely distressing alternations of circulation and temperature recurred about every hour in the daytime: after experiencing the "burning-heat" all over her she felt sick, often vomited, became extremely cold, and suffered from severe aching of the lower extremities. She was troubled during the night in much the same way: "I keep awake half the night," she said, "with those burning heats, and after the heats are gone I get very cold." Her appetite was "indifferent;" her bowels "pretty regular;" her feet were "nearly always cold." She was treated by means of the Lumbar Ice-bag and, in the first instance, took ammonii chloridi, gr. viii., infusi calumbæ, ℥ss. ter die; pilulæ aloes cum myrrhâ, gr. v., omni nocte. The medicines were discontinued in the middle of May; but the ice was used until the beginning of September.

May 9th.—The pains in the limbs were "not near so great as formerly." The "burning-heats" now came over her only three or four times a day, and they went off more quickly than before. The nausea and vomiting had quite ceased. The feet were much warmer; and she slept "a great deal better." Appetite greatly improved.

September 5th.—The pains in the limbs, the burning-pain at the top of the head, the burning-heats which came over her, the sickness, nausea, and feeling of coldness, had all quite ceased. Her feet continued quite warm; she slept well, and in all respects felt well.

CASE 75.—*Violent Headache; Frequent Giddiness; Sleeplessness; Mental Disorder; Nausea; Frequent Micturition; Sudden Flushes and Profuse Perspiration; Habitual Coldness of the Feet.*

May 13th, 1871, I was consulted by Mr. N. P., aged forty-nine, whose principal complaint was overwhelmingly severe and persistent headache. The pain was chiefly at the top of the head, and was associated with a feeling of pressure in that part and at the back of the eyes, which felt as if they would be forced out. While the pain was very severe he felt inclined to sway backwards and forwards, not from any wish of his own, he said, but involuntarily: he said,—"I can't help it, and am rather more inclined to go backwards than forwards." He had never lost his consciousness, but had staggered, and had often felt giddy. His sleep was very insufficient and unrefreshing, and generally when he awoke he had headache. He was prone to despondency, which sometimes assumed the character of melancholia with suicidal tendencies, which became especially strong if he found himself near a river, a cliff, or any other precipice. He often suffered from nausea, and sometimes from vomiting. When his attacks were severe and prolonged he passed limpid urine very often—on many occasions not less than a dozen times a day. The top of his head felt abnormally hot; he said it was always excessively hot, and that for a considerable time past he had been obliged to bathe it with spirits and water to keep it cool. The crown of the head was becoming bald. During his severe attacks, whether by night or day, he became extremely red in the face, his eyes became bloodshot, and he felt, he said, just as if he were standing before a fire. Moreover, he was often troubled with general and sudden flushings, and then immediately afterwards he broke out into a profuse sweat "from the crown of the head to the soles of the feet." His feet were remarkably and habitually cold.

About twenty years before the patient consulted me he had had typhus fever, and since that time he had suffered from headache at frequent intervals. During his best times he generally had headache, on an average, two days out of six. Throughout the first seventeen years of the period in question the pain was chiefly in the forehead: only during the three years before he came to me the pain had been seated at the top of the head. His severe attacks were becoming increasingly frequent and prolonged: at the date when I first saw him he declared that the attack from which he was then suffering had lasted three weeks

uninterruptedly, and that, in fact, he was "seldom clear" in his head. His eyes were generally so blood-shot during his attacks that his children could always tell when he was suffering more than usual. He had long held a very responsible situation, but during a considerable time before he first consulted me he had been wholly incapacitated from discharging his business duties.

The Neuro-dynamic treatment of this patient, which involved the application of heat as well as cold to the spine, was continued uninterruptedly from the middle of May to the end of November, 1871, and during a part of this time was the only treatment adopted. In the course of the treatment, however, I prescribed at different periods in succession iodide of potassium, bromide of potassium, bromide of ammonium, chloride of ammonium, tincture of calumba, sulphate of beberia, and aperient pills. No appreciable help was derived from the three first of these medicines; I thought the chloride of ammonium was, perhaps, of slight use, but the sulphate of beberia proved, I believe, of real value as a co-operative agent in accomplishing the cure which was effected in this case.

I shall not trouble the reader with a detailed report of the progress of this patient, whom for a long time I saw weekly, but will merely state the result. He improved steadily, and by the end of October had become so well that at that date he resumed his business duties. The treatment was, however, continued another month, and meanwhile he was able to work from 8 a.m. to 8 p.m. without feeling any evil effects from doing so. In the middle of December—a fortnight after treatment had been wholly discontinued—he called upon me and said that his strength and appetite were good, that he was in excellent spirits, and that he was as well as ever he had been in his life, except that he was still liable to have a slight headache in the morning occasionally, and to flush when he was excited.

July 29th, 1872, I saw this patient again. He reported himself to be continuing well: his eyes were quite clear; his appetite was good; his bowels were regular; he slept fairly well; and he was gaining flesh. During the very hot days of the previous week—the thermometer being at 92° in the factory he superintended—he felt a little giddy; but, by applying ice as before, he quickly regained his usual health. For a long time previously he had taken no medicine, and only occasionally had he found it necessary to resort to the Spinal Ice-bag.

CASE 76.—*Neuralgia of both the Upper Extremities; Pain in the Temples, between the Shoulders, in the Lower Part of the Back, and in both Hips; Numbness and Swelling of the Hands; Fainting Fits; Impairment of Sight and Memory; Leucorrhœa.*

May 24th, 1871, Mrs. V., aged forty-nine, suffered from neuralgia of both her upper extremities. She was in pain the greater part of each day. The pain in the left limb was the worst. The pain generally began in the first phalanx of the middle finger of the left hand; but sometimes the fingers of the right hand were first affected. In either case the pain extended completely from the fingers to the shoulders. Both sides were often, but not always, attacked at the same time. The attacks began so suddenly, that if she had anything in her hand she was obliged to drop it unless it were taken from her; the veins of the limbs, and especially of the hands, rapidly swelled, and the hands themselves became red; the arms seemed to be immediately paralyzed. She said, "The pain comes on as a fearful numbness: if I had my choice I'd rather go through my labour pains than bear what I have to suffer of a night." She often sat up a considerable part of the night from fear of the pain coming on as soon as she became warm in bed, for then the paroxysms were most prone to recur—"all of a sudden." She also suffered from pain between the shoulders, and often in the temples.

The disease came on about eight years before she consulted me, when she had, she said, "a coldness" of her right elbow, and "couldn't get it warm, and seemed to lose the use of the arm." Pain followed the coldness and weakness, and recurred at increasingly frequent intervals. During the previous twelve months she had never passed a week without attacks. She said, "I always find them come on after I've been doing anything." She had been obliged to give up her ordinary domestic work, and for many months past has been unable to dress herself; she could scarcely walk a dozen yards. She said, "If I attempt to walk, the pain comes across the hollow of my back, right down to the lowest part of it, and in both hips dreadfully, and the pain between my shoulders—I can hardly bear it." When attempting to walk but a very short distance she was obliged to stand still several times. Between two and three years before I saw her she began to have "fainting-fits," always brought on by the pain in her hands, arms, back, and shoulders. Indeed, sometimes the pain seemed, she said, to be all over her. Any excitement, worry, or considerable physical exertion induced a fresh attack of pain,

which, becoming intense, was soon followed by faintness. She felt, she said, as if the use of her limbs were suddenly taken quite away. She became very cold during each fit. Generally while she remained cold, prostrate, and helpless, she knew what passed around her, but she could not speak; often she lost her consciousness more or less, sometimes completely. "Then, after I get better of the fit," she said, "I come over of a fearful flush." Since these fainting-fits began, they had recurred several times a week; sometimes she suffered from them two or three times a day. Both her memory and her visual power were much impaired. Pressure along the spine showed the whole of it to be extremely tender; but the region of the fourth and fifth cervical vertebræ was horribly so. Appetite feeble; bowels regular. Menstruation ceased eleven months previously. She had been troubled with leucorrhœa since her first child was born, sixteen years before she consulted me.

The treatment of this complicated case extended through several months: the Spinal Ice-bag was the chief agent relied upon, and, indeed, was the sole agent until July 7th, when I also prescribed cod-liver oil. Subsequently she took small doses of chloride of ammonium, and during the latter period of treatment citrate of iron and quinine. Warm baths were also used occasionally.

May 31st.—The pain had lessened considerably both in duration and intensity. On the third night of using the ice the pain was so much lessened that the patient slept four hours. She said, "I've not slept so for months, and my hands have not been drawn up: I can now hold anything." The veins were less distended, and the limbs were less swollen than before.

June 22nd.—She used the Spinal Ice-bag as directed pretty steadily until the 16th inst., and meanwhile continued quite free from pain each night, and slept nearly the whole of each night continuously. "Indeed," she said, "I can sleep at any time in the daytime now. I fancy the ice draws you to sleep; I don't know whether it is fancy." The pain in the daytime had recurred much less frequently, had been much less intense, and had continued a much shorter time than formerly. She had been many days without *pain;* but she thought the numbness was not lessened. There was still less "puffing-up"—as the patient called it—of the veins, and swelling of the hands. The pain between the scapulæ was much lessened; but that across the loins continued "very bad." On the 16th inst. she ceased using the Spinal Ice-bag because she was unable to get ice; on the 18th she became very ill, and "fainted away with pain;" on the 21st she fainted twice from the same cause, and lost her consciousness completely; on the 22nd she resumed the use of the ice.

June 29th.—She had become very much better: she had been

three days without any pain at all, and had neither fainted nor felt faint since the date of her previous report. She said, "I've been better altogether this last week than I've been for months."

July 7th.—She continued to improve. At this date she remarked, "My memory and my eyesight are better."

July 17th.—She said, "I get a full night's sleep generally now. I may wake sometimes, and even lie awake a couple of hours,—but not in pain, as I used to do." She had also passed many days without having any decided attack of pain in the daytime. What she continued to be troubled with was "more numbness than pain." In reply to my inquiry what evidence she could give me of improvement in her arms, she said, "Why, being able to use them. For many months before I saw you I could not dress myself; now I can do so easily, and can use my needle." She added, "When I used to go to bed and drop asleep, I woke up in agony; now I never do so." She reported also that her appetite was much improved.

July 26th.—She informed me that for some time previously she had rarely had any pain in the upper extremities; but that she still felt the numbness in her hands, and to some extent in her arms. She had gained greatly in general strength, and especially in her power of walking. At this date she could walk quite easily from her house to mine—a distance of upwards of a mile—without any pain at all. She had also acquired the habit of sleeping as soon as she went to bed and sleeping till morning. The leucorrhœa had been steadily lessening, and during the previous fortnight she had not been troubled with it at all.

August 9th.—She had been to Sheerness, and since she last called upon me had been without ice. She was not so well again, and ascribed her relapse to omission of the ice; she had pain and swelling in the hands again, and the pains had recurred in her elbows, "but not so violent as before." She still felt very well in herself. She promised to resume the use of the ice without delay.

Sept. 13th.—By my request she had six decayed double teeth extracted a few days prior to this date; she thought the numbness had been a little lessened since. She continued to have good nights.

Sept. 22nd.—She thought she had caught cold; she felt the Spinal Ice-bag cold, and her chest becoming uncomfortable, I advised her to suspend the use of the Ice-bag, and to take a warm bath at 98° F. during an hour every other day.

Oct. 4th.—At this date she had been without ice three weeks. The numbness in the hands had returned almost as bad as ever, and the pain was beginning to return. She was also sleeping less well again; but otherwise she felt well. She had had no return

of the leucorrhœa. I advised her to apply the top cell of the Spinal Ice-bag along the cervical spine till the ice should be melted, three times a day.

Oct. 25th.—She reported that she had continued the ice regularly as directed, and that she had remained quite free from pain, unless when she did heavy work—washing, for example. She could do ordinary house-work without any pain at all, and had, she thought, been able, except at the times mentioned above, to do so during the previous three months. She still felt the numbness, but it was markedly lessened ; she had had no more fainting-fits, and continued quite free from leucorrhœa ; she slept all night every night, and so soundly, too, that even the alarm of fire on the previous night quite near her (in Hare Court, Temple) did not awake her. She was, in fact, in all respects better than she had been for many years. I recommended her to continue the treatment previously prescribed.

Jan. 29th, 1872.—The patient followed my directions during a few days only after I last saw her, and then, continuing to feel remarkably well, left off the use of the Spinal Ice-bag, and had not since resumed it. Excepting during a few days at the end of the previous month, and again just before coming to me on this occasion, she had passed the previous three months without pain. In both instances the temporary recurrence of the pain was caused by the labour of washing. Otherwise, she had been astonishingly well : she said, " I hadn't even the numbness, or that dead feeling in the spine of my back," and no one of the other ailments from which she suffered when she first consulted me had returned. I advised her to apply ice again if the pain should recur, and prescribed, ferri et quinæ citratis, gr. v. ; olei morrhuæ, ℥ ij., bis die.

March 4th.—She had not found it necessary to use the ice again : she had not been troubled with pain, unless she brought it on by doing some especially hard work, and then it was comparatively slight. She looked thoroughly well, and said she felt so. Her complexion and expression were wonderfully improved. I advised her to continue the medicines last prescribed some time longer, and to re-apply the Spinal Ice-bag as before if the neuralgia should recur.

July 1st.—I saw this patient for the last time at this date : her condition and report were essentially the same as at the previous date. She could do all ordinary domestic work without suffering ; only when she exerted herself violently did she experience any pain. In other respects she continued perfectly well. During the preceding half-year she had used ice very rarely ; but if, on any occasion, after inducing the recurrence of pain for a short time by extra exertion, she re-applied the Spinal Ice-bag, she obtained speedy relief.

CASE 77.—*Severe Gouty Pain, with Swelling and Stiffness of the Right Knee and Foot, and Pain in the Left Foot.*

William S., aged forty-six, consulted me May 30, 1871, when he was suffering from a very severe attack of gout in the right knee and foot, and also, though less severely, in the left foot. The knee was greatly swollen, very red, acutely painful, and could not be bent at all. The right foot was also much swollen, and very painful; the left, though not appreciably swollen, was decidedly painful. I prescribed a simple aperient mixture, and the application of ice along the dorso-lumbar region, during an hour and a half, three times a day.

The effect of the treatment in lessening the pain was distinctly manifest during the first day; and in about thirty-six hours after the treatment began the patient could partially bend the affected knee. The pain and swelling steadily and simultaneously declined, and at the end of five days had wholly subsided; and, meanwhile, the knee-joint became perfectly flexible. The Spinal Ice-bag was used as prescribed during seven days; and then I prescribed ferri et quinæ, gr. v., ter die. The patient remarked,—"I cannot describe the suffering I was in before I put on the ice, which seemed to drive the pain away."

CASE 78.—*Severe Pain over the Chest, in the Shoulders and Four Extremities, with Rigidity of the latter, and other Symptoms of Disorder of the Spinal Cord.*

Mrs. E., aged twenty-nine, consulted me 30th May, 1871, when she presented the following symptoms:—Her arms and legs became "stiff" every morning, and generally continued so until the afternoon, when they became more or less relaxed. She said,—"If I get anything in my hands I don't feel as if I can hold it, and my hands become stiff." She suffered from a peculiar tightness about the chest; the feeling, she said, "seems to come on as if everything were strapped on me, and the pain goes up the left side of the neck, and I become quite stupid." She suffered great pain in the chest, shoulders, arms, and legs: she said it was most severe in the chest, shoulders, hands, and ankles, and that sometimes it affected her "in the stomach, and around the heart." When the pain came on severely she felt as if her mouth were drawn open, her face and eyes felt tight, she was troubled with lachrymation, and oppressed with drowsiness. The pupils were rather dilated; she suffered frequently from sickness; she passed

water about three times an hour during the day. Pulse 120; the hands were tremulous and jerky. About a month before I saw her, having gone to bed fairly well, she found on the following morning that she was unable to get up, owing to great weakness and pain in the shoulders, chest, and legs—the pains in the legs were of a darting character: such was the sense of pressure on the chest that on one occasion she had her clothes cut open because she thought they produced it. When the attacks came on, she broke out into a violent sweat every morning, and this symptom had continued—though in a less pronounced form. Three or four weeks before she was attacked as described, she felt pain along the spine—most severe between the scapulæ and extending to the sacrum. The pain, she said, "was not a starting pain, but a dreadful pressing pain, that came on first in my back as if the strings of my clothes were tied behind, and as if the knots were pressing in my back: it affected my breath,—it seemed as if I could not get my breath; my husband gave me brandy, but it made me worse; I tried rum and milk, but it seemed to make me a great deal worse. When I attempted to wash the steps with a flannel, I could not move my arms, and so was obliged to give it up." About three weeks before she consulted me her skin, especially over the chest, was very irritable, and in that region there were several "red flat spots." I directed the application of ice over the whole length of the spinal cord three times a day, each application to be continued until the ice should be melted. No medicine.

June 6th.—The pains along the middle of the back had much lessened, as also had the rigidity of the limbs, and she could hold things in her hands much better; she had no longer any feeling of tightness over the face; the tightness over her chest was greatly lessened, and the pain in the thoracic and abdominal parieties was also much less severe. Pain in the limbs was still considerable. She felt much stronger generally, and her sickness had almost ceased. Moreover, she was making water not more than six times a day. Pulse 100. She was directed to continue the ice as before, and to take aperient pills when her bowels were confined.

July 11th.—Pain in every part of the body had quite ceased; all sense of rigidity or stiffness had also subsided. The head still felt "thick" sometimes, but she had ceased to feel sleepy in the day time. She was making water only four or five times during the day—not at all at night. The tremors and jerks of the hands had also quite ceased. Perspiration normal. She was directed to apply the Spinal Ice-bag as before, but only twice a day, and still to keep her bowels open daily by means of aperient pills if necessary.

August 2nd.—The Spinal Ice-bag was used about half-a-dozen times after the date of the previous report. The patient declared herself completely relieved of all her troubles. Treatment discontinued.

CASE 79.—*Sciatica on both the right and left Side; Severe Pain in the Loins; Headache; Giddiness; Mental Heaviness and Depression; Habitual Constipation of the Bowels and Coldness of the Feet.*

June 26th, 1871, Louis C., aged thirty-four, was suffering from sciatica chiefly in the right leg, but often in the left. The pain began about three months previously in the left leg, especially along the anterior part of the thigh, but soon became most pronounced in the right. The pain was worst near the ischiatic tuberosity, and was also extremely severe in the calf on the peroneal side, and along the inside of the foot. The paroxysms were most severe each evening, so severe that the patient feared to move himself in any way, and often remained bent forward. Pressure on the ham in sitting down, or coughing, augmented the pain extremely. He was always in pain while awake, but only in the evenings, as a rule, did the severe paroxysms come on. Movements, however, brought them on at other times. He complained of great pains in the loins which he felt to be very feeble. Often he had the sensation of "pins and needles" on the peroneal side of the right leg. The patient also suffered from headache several times a week; the attacks were often of the nature of hemicrania, and were accompanied with giddiness, heaviness, and a longing for sleep. When he did sleep he slept too heavily, and was fatigued by it and depressed. He said, "il me semble toujours que j'ai envie de pleurer." He had a feeling as if his chest were forcibly compressed. Appetite good. Bowels open only every second or third day. Feet habitually cold.

The treatment in this case, during the first month, was exclusively by means of the Spinal Ice-bag.

July 31.—He had been ten days quite free from pain. His headache had ceased. His bowels were open daily without the use of aperient medicine. He reported himself "tout-à-fait bien." His feet had become quite warm. His loins were then so strong that he could walk a considerable distance without either pain or fatigue. He remarked, however, that he did not sleep very well. I advised him to continue the application of the Spinal Ice-bag, and to take Potassii bromidii, gr. x., aquæ camphoræ, ℥j., each night.

This patient returned to France and I did not see him again after the above date, but the lady who advised him to consult me has since informed me that when she afterwards heard from him he continued quite well.

CASE 80.—*Severe Brachial Neuralgia; Headache and Backache; Deficient Sleep; Smarting Pain in the Eyes; Cough with Copious Expectoration; Sickness; Leucorrhœa; Prolapsus Uteri; Unduly frequent Micturition; Coldness of the Feet; Great Tenderness of the whole Spine.*

Mrs. C. S. R., aged forty-five, complained, July 13, 1871, of constant pain from which she had suffered since the previous November in the thumb, thenar eminence, wrist, and along the arm up to the shoulder of the left side. It was most acute in the thumb, and was greatly increased by walking and by the supervention of menstruation. The pains also extended, but less severely, down the left leg, along the right arm, and into the right thumb. The left arm felt painfully heavy, it also felt numb, and was always much the most painful at night; she was constantly liable to severe pain in the back which was always reproduced by walking; she suffered from an almost constant and peculiar headache, a feeling, she said, as if her head would burst; had always been a bad sleeper, but her nights had become "much worse" at the time she consulted me. Her visual power had greatly declined during the preceding six months; she could just make out test-type 1½, she read 3 with difficulty, and 3½ with fair ease; she had smarting pains in the eyes, "as if," she said, "she had'nt had enough sleep. She had a cough with considerable expectoration which was especially copious in the mornings. Tongue thinly furred. Appetite "very bad;" she was frequently sick, the mere sight of eatables often produced nausea, and from the time she first began to menstruate she had always been sick at her periods. The bowels acted regularly. The catamenia recurred regularly once a month and continued a week each time. During the first two or three days of her periods she suffered great pain in the back, womb, and thighs, "in fact, all round," she said, as well as from sickness. Leucorrhœa she was always troubled with during the whole of each catamenial interval; she had a constant sense of bearing down of the womb; "when I walk," she said, "I feel as if it were all open—so peculiar, when it's worse my cough is very violent." She was obliged to rise each morning about four to urinate; and needed to pass water very often in the daytime, but sometimes could not when she

tried, and then was only enabled to do so by sitting over hot water. Her feet were habitually and excessively cold; in the winter they were never warm, and even in July, when I first saw her, she said—"They were very cold last night, and I was quite shivering." Pulse 78—soft and regular. The whole region of the spine was exquisitely tender.

The treatment in this case was exclusively by means of the Spinal Ice-bag and infusion of calumba, and was continued until Dec. 14, 1871, in fact, just six months. A striking improvement was effected even within the first seven days of treatment; she said, July 20th, "I've not brought so much pain with me, my head's better, lighter, and my feet are much warmer." She informed me at the same date that already she felt the pain in the right arm "very rarely," and only "very slightly;" that she bore the walk to my consulting-room better than she had done the previous week, and that the cough and expectoration had markedly lessened; she added, "*I find the ice very agreeable; I look for it, and would like to have it on longer each time.*" And again, July 27th, she said, "*I go to sleep with the ice on, it's astonishing how pleasant it is.*" At this date she reported her nights and appetite to be much improved.

August 3rd.—She reported her head to be so much better that it was "no longer like the same head;" that both her sleep and her appetite continued to improve; that her cough had almost subsided; that the leucorrhœa and bearing down of the womb had lessened, and that her feet had become continuously warm.

November 15th.—Every vestige of her neuralgia and of her headaches had completely disappeared; she felt neither the heaviness of the arms nor the numbness frequently complained of; she had no cough, no expectoration, scarcely any leucorrhœa, and no prolapsus uteri or bearing down feelings whatever; she was no longer obliged to urinate with undue frequency, and had quite ceased to rise early in the mornings in order to do so. The tongue was quite clean, and her appetite thoroughly good; she was sleeping full six hours each night; she had no smarting of the eyes; she could read test-type 2 fairly well without hesitation, and 2½ with perfect ease.

Dec. 14th.—Every symptom of which the patient had complained in July continued absent, and the treatment was left off.

Three months after all treatment had been discontinued I saw this patient again—viz., on March 12, 1872; she had had no relapse in respect to any of her symptoms; she was in excellent condition, and stated that she had not passed a winter for years so well as she had passed that of 1871-2.

CASE 81.—*Neuralgia of the Testicle; Headache; Eye-ache; Peculiar Influence of the Nervous System on the Bowels; Coldness of the Feet.*

Mr. ——, aged forty-four, married, consulted me, Aug. 1871, when he complained of pain in the left testicle occurring on an average about three times a week, and chiefly in the evening. The pain was increased by walking and "anything of an exhausting nature." He was also greatly troubled by a peculiarly distressing coldness of the glans penis: referring to the presence of this symptom during the preceding winter he said, "the constant chilliness of the penis was horrible." He believed his sexual power had declined; he had no desire for intercourse with his wife, and seemed, he said, "to be dried up." Nevertheless, he not unfrequently found the penis erect when he awoke in the morning. During the preceding six months he had been troubled with headache "once or twice a week." The eyes were prone to ache, and the left one was troubled with muscæ volitantes. During the preceding twelve months he had felt a little weakness of the right hand; being a musician he found that it trembled when he went before an audience and, as leader, used the baton. He was conscious of having become especially "nervous" during the preceding eighteen or twenty-four months, and was so troubled in this respect that whenever he was going to give a concert or to perform in public he felt a sort of apprehension affecting his bowels and causing him to have a markedly loose stool about five minutes before the performance began. Otherwise his bowels were prone to be rather constipated. He had been "getting more bilious" and felt "qualmy fits at times." He had been subject to coldness of the feet all his life, but latterly this symptom had become more pronounced. He perspired very freely. Pulse 80—regular. His habits were especially temperate in all things except work; in that he indulged immoderately. The treatment of him included the use of the Spinal Ice-bag, and of the following medicines in succession: Ferri et quinæ citras cum ammonii bromidio; acidum phosphoricum dilutum cum strychnia; Oleum morrhuæ.

Exactly a month after I first prescribed for him he reported to me that the pain in the testicle had quite left him, that the penis had become "perhaps a little warmer;" that he rarely had headache; that he thought his eyes somewhat better, and that he felt much less nervous—no longer worried about matters as formerly. He added, "I'm not so soon knocked up, and don't feel that tremendous sinking which I formerly did."

November 19th, 1871.—I received a letter from him in which he reported progress; the pain in the testicle had not returned; the sense of coldness of the glans penis, though still experienced, was decidedly lessened; he felt much less nervous; he was, "to a great extent, rid of that fear of an audience," and had quite ceased to be "troubled with diarrhœa just before a concert." I did not hear from this patient again.

Case 81a.—*Nephralgia.*

Françoise B., aged thirty-five, was suffering from very acute nephralgia when I was requested to see her, September 29th, 1871. She had severe pain in the loins, which spread over the left side of the abdomen, invaded the groin, and was especially acute along the inner side of the left thigh. The pain was excruciatingly intense, of a shooting character, and more or less paroxysmal. The patient was very excited and restless, had considerable fever, high pulse, acute headache, furred tongue, and was much troubled with nausea and vomiting.

This patient was treated exclusively by the Neuro-dynamic method—one Spinal Ice-bag being applied along the lower half of the spine, and another across the lumbar region, so that the two bags formed an inverted cross. The vomiting and nausea were thoroughly subdued, and the pain was greatly abated, before the close of the first day of treatment. On the second day the patient was almost wholly free from nephralgia, she was wholly free from headache, was quite calm, and her general condition was strikingly improved. On the third day she was altogether free from pain, and so well generally that she resumed her usual occupation.

Case 82.—*Facial Neuralgia.*

Mary Ann S., aged twenty-two, consulted me, Oct. 3, 1871, suffering from infra-orbital neuralgia, the chief focus of which was over the left malar bone. The pain came on in violent paroxysms most generally about five p.m., and lasted very severely between four and five hours. The disease began in the winter of 1870-71, and gradually increased in severity: during the three months before she consulted me the patient had had the pain "every day quite three weeks out of four." When describing her sufferings she said, "The pain begins all of a sudden; you know how toothache begins, this begins just like it." Before the pain was felt the area of pain became red: she said, "I can feel it

flush up before I feel the pain;" and during the paroxysms the part could not only be felt but could be *seen* to throb. For some time immediately before I was consulted the patient had also experienced a dull aching between the paroxysms; she said, "I feel it even while I sleep." There was a decayed molar tooth in the upper jaw of the affected side, but the patient refused to have it extracted. Pulse very feeble—126; appetite bad; bowels open daily; catamenia normal.

I prescribed the application of the 8-inch Spinal Water-bag containing water at 115° F. whenever the paroxysms threatened to recur, and at other times when any pain was felt.

The patient's brother called upon me some time afterwards, and informed me that the use of the heat as directed stopped the pain, and that she soon completely recovered.

CASE 83.—*Neuralgia of the Four Limbs; Distressing Sensation in the Throat; Headache; Pain along the Spine; Cramps; Faintness; Profuse Leucorrhœa; Excessive Coldness of the Feet.*

October 4th, 1871.—Mrs. A., aged thirty-four, eight months pregnant, applied to me at the Farringdon Dispensary when suffering from continuous aching of both forearms, with extension of the pain through the hands, and affecting the fingers, and of the thighs and knees: the pain was worst in the right side. She was also much troubled with pain along the spine, usually beginning between the shoulders and reaching down to the lumbar region: she had "a bad headache most days," had cramps in the calves of her legs, and often felt faint. She especially complained, too, of a peculiar and distressing sensation in the throat, just as if she had swallowed a "fish-bone": she was also troubled with nausea each day, and often in the night. She was generally very chilly, and felt as if cold water were trickling down her back: she had profuse leucorrhœa, and her feet were habitually very cold. Pulse 108.

The pain began in the lower extremities about the previous Christmas, and soon invaded the upper. They were much increased, and, when absent brought on immediately, by any fright, painful excitement, or hurry. The cramps in her calves had troubled her during each of her pregnancies. About three months before she applied to me she began to experience a distressing sensation in the throat, which she thought due to a fish-bone. She remembered taking some fish about that time; she then swallowed some bread, which she thought lodged there too; and

soon afterwards she took a piece of gristly meat. Ever since then the sensation had been increased, and was troubling her extremely and constantly. She suffered much from sickness and vomiting during the early months of her pregnancy—the nausea she still complained of being a remnant of that malady. She menstruated irregularly and with undue frequency (almost every fortnight) until she "quickened," and had "always suffered very much" from leucorrhœa.

This patient was treated exclusively by the Neuro-dynamic method: the decisive and rapid improvement which was effected in her is indicated by the following reports.

Oct. 10th.—The aching of the thighs and knees had quite ceased, and that of the upper extremities had nearly ceased. She said,—"I've never had the cramps since I've used the ice." The upper part of the spine was, she reported, much better, and, she added,—"My throat is ever so much better: it used to keep me awake for hours in the night—now it don't wake me at all." Her headaches and leucorrhœa were much lessened, and her sickness and faintness were "all but gone." Her appetite was "much better," and her feet were warm. She remarked that she found the ice very comfortable.

Oct. 24th.—She found herself still better in all respects, and her throat so comfortable that she was concerned to know whether she would be allowed to use the Spinal Ice-bag in the Lying-in Hospital, where she expected to be confined. She said she left off the ice during thirty-six hours, and became so bad again that she dreaded to be without it.

Nov. 7th.—All her troubles, except that of the distressing sensation in her throat, had ceased to recur. This was apt to recur after meals, but was relieved by means of the Spinal Ice-bag every time it was applied.

Jan. 2, 1872.—The patient had been "confined" in the Endel Street Hospital, and during the first sixteen days after confinement she continued quite free from all the disorders about which she first consulted me; but at the end of that time the chimney of the ward where she lay took fire. Her bed was quite near the fire-place, and she was very much frightened: all her pains in her back and limbs came back; she suffered much from her throat again; she complained of tingling in all her limbs, and over the chest and back, and said that where she had the tingling the skin became "goosey" and cold, and then that burning-heats and perspirations came on. The tinglings came on in fits during both day and night—worse at night. They recurred six or eight times during each night. She sweated while she tingled, the sweat falling off in drops. She said,—"I seem cold, and yet I seem hot." After the tingling subsided she grew very cold—the back

more so than any other part. The affection of the throat differed on this occasion from what it was in the first instance: instead of feeling, as before, that something was "laid across it," as she said, she experienced severe shooting and constant pains in it. They kept her awake many hours each night. Her bowels were obstinately constipated. She was again treated in the manner which had previously proved so effective, and all her symptoms soon yielded again completely. In the middle of March following she continued quite free from them, and the treatment was discontinued.

CASE 84.—*Headache; Ocular Neuralgia; Nausea; Leucorrhœa of Five Years' Duration; Deficient Catamenia; Frequent Flushings; Extreme Coldness of the Feet.*

October 18th, 1871.—Mrs. K. B., aged thirty, applied to me in consequence of suffering from very severe pain in her head and in her right eye. The pain was most acute at the back of the head; the pain in the eye generally came on simultaneously with the headache—in the morning—and was intensely severe. She suffered habitually from nausea, and from leucorrhœa, which began soon after her marriage, five years previously, and had continued ever since. Her catamenia was so slight that she might fairly be said to be suffering from amenorrhœa: from the time she first began to menstruate, when she was fourteen years old, she had never been obliged to wear a napkin. She was treated in the first instance by means of the Spinal Ice-bag alone.

October 31st.—The patient reported that her feet had become much warmer, and that the Spinal Ice-bag made her warm all over each time she put it on: she had felt neither sickness nor nausea; her flushings, which had stopped during the first week of treatment, recurred slightly at this date. I requested her to continue the use of the ice as before, and to take the following medicine:—Potassii bromidi, gr. v.: Potassii iodidi, gr. ij½.; Aquæ camphoræ, ℥ss., ter die.

November 7th.—The headaches had become less frequent; came on later in the day than formerly, and lasted a shorter time. Sickness had not returned; appetite improved; leucorrhœa lessened. She said,—"My feet have been warmer ever since I have had the ice." I advised it still to be continued, and prescribed—Ferri et quinæ cit., gr. iv., bis die.

Nov. 21st.—Had had headache only once; the flushings had quite ceased; nausea had not recurred.

Nov. 5th.—The catamenia recurred ten days previously, and were healthier and more copious than hitherto. The patient seemed to be much impressed with the action of the Spinal Ice-bag in increasing her warmth. At this date she said,—"About five minutes after I put the ice on I am warm all over." I now directed the Spinal Ice-bag to be applied along the lower two-thirds of the spine, forty-five minutes, twice a day, and prescribed—Potassii bromidii, ferri et quinæ citratis, āā gr. v., ter die.

January 2nd, 1872.—She said "my head has been beautiful; I have never had headache for a whole fortnight." I ordered the ice to be continued as before, and prescribed—Pilulæ aloes et ferri, gr. v., omne nocte; Ammonii chloridi, gr. viij., Infusi calumbæ, ℥ss., ter die.

April 4th.—The patient continued the use of the Spinal Ice-bag until this date, and took the medicines which I prescribed from time to time during the interval, but of which I kept no record. At this date she had been quite free from pain, both in the head and in the eye, during two months. Sickness had never returned; her feet were habitually warm; and the menstrual flow had considerably increased—it lasted three days, and she was obliged to wear napkins during the whole time; moreover, the discharge, which previously was not only scanty, but whitish, had become of a bright red colour. The leucorrhœa had completely ceased. As she was now quite well in all respects the treatment was discontinued.

CASE 85.—*Flying Pains in Various Parts of the Body; Painful Excitability of the Spinal Cord, with Great Tenderness along the Spine; Excessive Flatulence; Profuse Leucorrhœa.*

October 21st, 1871.—Mrs. M. J., complained to me at the Farringdon Dispensary of suffering almost continuously from pains, now in one part of the body, now in another, and of aching of the back. Her abdomen was largely and almost constantly swollen, causing her great distress, and especially embarrassing her breathing. She was also troubled with very copious leucorrhœa. I treated her by means of the Spinal Ice-bag exclusively.

Oct. 28th.—She reported herself much better in all respects, and especially that her leucorrhœa had already lessened.

Nov. 14th.—She said the Spinal Ice-bag had taken away her pains, that she was now very seldom troubled with wind, whereas before using the bag she used, she said, "to swell to such a size." The leucorrhœa had very "nearly ceased." She began to men-

struate Nov. 9th, the flow being more copious and continuing longer than on former occasions. This patient volunteered the following statement: "Before I used the ice my bosoms were falling away; now they've become quite round again. I believe that if I had had the ice years ago I should have had children." The patient wished to retain the bag which had been lent to her, and I never saw her again.

CASE 86.—*Severe Crampy Pains in the Abdomen; Backache; Distressing Tenderness of the whole Spine; Violent and Prolonged Diarrhœa, with Coldness over the whole Body; Leucorrhœa.*

Mrs P., aged thirty, applied to me Nov. 25th, 1871, when her chief trouble consisted of severe crampy pains in the abdomen, associated with diarrhœa. The pains generally came on in the night after she had been asleep about two hours, and then diarrhœa supervened; they often troubled also, however, in the day-time, and on the morning she came to consult me they were so intensely severe that she had to stand still several minutes in the street while on her way. She complained too of severe and almost constant backache; she suffered from leucorrhœa, and there was great tenderness of the whole spine. Her feet were very cold—"dreadfully cold, like stones," she said; and she was remarkably cold all over. In fact, her aspect was that of a patient in the first stage of cholera: her eyes were sunken, and her countenance was especially pinched and pallid.

She had been an epileptic since childhood. She began to suffer from violent diarrhœa about three months before she came to me, and the first onset of the disorder was preceded by severe crampy pains in the abdomen during about a fortnight. Throughout the whole three months since the diarrhœa came on it had never left her a week, and rarely a day. During the first part of that period the bowels were moved "fully ten times a day;" but the frequency of action gradually lessened, and when she first consulted me they were moved in the day-time only after she had taken food or drink, the effect of which made her almost afraid to take anything, "because it brought it on." At night the disorder still continued to manifest itself with remarkable regularity: it came on after the patient had been in bed about two hours, during which she generally slept—though not soundly, and as a rule was preceded and accompanied by the pains already mentioned. I prescribed the application of the Spinal Ice-bag, from thirty to sixty minutes, twice a day—the

precise length of time it should be applied to be determined by her tolerance of it.

Dec. 2nd.—The Spinal Ice-bag, she said, startled her at first; but by the time she had had it on twenty minutes it seemed to warm her all over. Her feet had become warmer than they had been for several months. Since November 26th the symptoms had gradually abated, and, on the night of the 29th, she experienced quite a change: she passed the night without diarrhœa, and the pain had almost subsided. Last night she had to get up but once, and the pain was "very trifling." She slept much better. "In fact, these nights," she said, "I've gone to sleep with the ice on." Her appetite had greatly improved, and her increased warmth continued.

Dec. 23rd.—Since last report she had had much trouble, caused by the illness and death of her child, and had been able to use ice at night only. She reported that she continued warm all over; that she had no pain at all since the 19th; that the diarrhœa was almost wholly stopped; and that neither food nor drink was any longer able to bring on the disorder. She had had scarcely any pain in the hollow of the back, and during the previous fortnight she had had no leucorrhœa at all.

Dec. 29th.—She reported herself completely recovered from the maladies which had troubled her: all pain, diarrhœa, and leucorrhœa had completely ceased; she continued warm; and her general health and strength had so increased that she said,—"I don't feel like the same woman I used to be." Treatment discontinued.

CASE 87.—*Enteralgia; Loss of Appetite; Indigestion; Nausea; Watery Eructations; Vomiting; Obstinate Constipation; General Chilliness.*

Mr. G. D., aged thirty-seven, a plumber, applied to me at the Farringdon Dispensary, November 29th, 1871, when he was suffering from very severe enteric neuralgia. He described the pain as being deep-seated in the bowels, dreadfully intense across the centre of the abdomen, and as ascending sometimes along each side of the chest. It often lasted, with a few short intervals of respite, throughout the whole day. His appetite and digestive power were much impaired; he felt nausea habitually; was much troubled with watery eructations, and vomited frequently. Sometimes he ejected extraordinarily large quantities of bile. His bowels were, and had long been, obstinately constipated. He complained too of an habitual feeling of general chilliness. The severe pain began about a year before he came to me, and had

gradually increased in intensity and frequency of recurrence. He had been working as a plumber from the time he was fifteen years old, and had had lead colic from twelve to eighteen times. His health had been gradually failing during the two or three years before I saw him. During that time he had experienced considerable pecuniary losses which had pressed upon him and made him worse. He had been disabled from work during ten weeks immediately before he came to the Dispensary. Previous to the onset of the enteralgia he had violent cramps in the legs—chiefly in the calves. I treated him by means of the Spinal Ice-bag. I also prescribed aperient pills to be taken occasionally, and an ounce of infusion of calumba, to be taken twice a day.

Dec. 2nd.—The patient reported himself better: the attacks began at a later hour in the morning than before, and were less severe each time they recurred. His appetite had already improved, and he felt himself not only better bodily, but in better spirits.

Dec. 5th.—He passed the night of Dec. 2nd, after using the Spinal Ice-bag, without pain: he went to bed at nine p.m., and slept till five a.m., when he awoke without pain. Since then it had not recurred.

Dec. 9th.—He had had no return of the pain after it subsided a week previously; his appetite was thoroughly good; he was no longer troubled with indigestion, watery eructations, or vomiting; his bowels had become open daily, so that he had no need of the aperient pills; he felt much warmer, and, in fact, well and comfortable generally. Feeling quite able to resume work, and having the offer of the management of a business in the country, he accepted it, and I did not see him again.

CASE 88.—*Gastralgia, Vomiting, and Habitual Constipation.*

Mr. E. W., aged fifty-six, consulted me Dec. 5th, 1871, on account of severe and long-continued pain in the stomach. The pain was not concentrated at any one point, but was diffused over the epigastric region, and was not increased by pressure over any part of that region. The pain was dull, heavy, gnawing, and deep-seated. It usually came on in a slight degree between breakfast and dinner (he dined at one p.m.); between dinner and tea it recurred or increased; if it had not previously subsided it increased greatly, and persisted until he vomited, when he was immediately and, for the time, completely relieved. He generally vomited about five p.m. He first threw up about a teacupful of "perfectly clear water," and then a considerable quantity of white chyle-like fluid, of about the consistence of an egg beaten

up. He did not remember ever to have vomited anything that he could distinguish as food which he had taken. The ejected matter always appeared to have undergone the digestive process. After he had vomited he was, as a rule, free from pain till the following day ; but sometimes it recurred in the night unaccompanied with vomiting. He was also troubled with obstinate constipation, from which he had suffered many years. In other respects his health was good ; he looked ruddy and strong ; and, when untroubled by gastralgia, he worked from morning till night, discharging the duties of a responsible office in a large London business.

During his boyhood he was peculiarly liable to vomit, and during his apprenticeship he was often obliged to go home in consequence of suffering from persistent sickness. After arriving at manhood he got completely rid of his trouble during upwards of twenty years. It recurred in April, 1863, in a very violent form, and continued throughout May and June, during which he was incapacitated from attending to business. The attack on this occasion began with a "fainting-fit," and was accompanied by the loss of "a great deal of blood" from the bowels during seven or eight days. The next attack began in March, 1867, and lasted two months : his motions on this occasion were black, owing to the admixture of blood. Having recovered from this attack, he continued free from his malady during about three years. He had an attack in 1870, another in June, 1871, and another October 6th, 1871, and from that date until I first saw him, two months afterwards, he had rarely had a day of relief from suffering in the manner he described when he applied to me. He found mental excitement or "business worry" conduced to bring on the pain.

My treatment of him was by means of the Spinal Ice-bag, and in the first instance I also prescribed as follows :—℞ Potassii bromidii, ℥iss. ; potassæ bicarbonatis, ℥j. ; tincture calumbæ, aquæ distillatæ ā ā ℥iss. ; capiat, ℥ij., ex aquâ, ter die.

Dec. 17th, 5 p.m.—He reported that he found the Spinal Ice-bag very comfortable ; that during the 11th and 12th he was quite well ; that during the 13th and 14th he had some pain, though not severe, and without vomiting, and that from that time he had continued quite well.

Jan. 1st, 1872.—The patient called upon me and stated that until the previous day he had continued free from both pain and sickness, and that his general health had been excellent. During the previous fortnight he did not use ice at all. On Dec. 31st he partook of roast beef and plum pudding—a small piece of the latter. Violent sickness afterwards recurred. *The vomited matter was unlike that which he had formerly been in the habit of throw-*

ing up, but resembled rather the ordinary ejecta from the stomach, mixed with a considerable amount of mucus. He was sick this morning in the same way. I requested him to resume the treatment previously prescribed.

January 28th.—The patient reported that he had continued the use of the ice as directed during the whole of the preceding month, that from the time of resuming its use the sickness steadily declined, and that by the end of the first week it had completely ceased again. *During the whole of that week the sickness was accompanied by no pain whatever—an experience quite new to the patient.* He had had no pain since; he ate meat and various kinds of ordinary food without experiencing any discomfort, and said he never felt better in his life. He was particularly emphatic in his praise, not merely of the great efficacy of the Spinal Ice-bag, but of the remarkable comfort and agreeable sensations which it induced. He said that at first he was terrified by the idea of using it; but that he had come to look forward to it with pleasure, and generally that he fell into a sound sleep while lying upon it on the sofa.

I have seen this patient many times since the last date mentioned, and up to the time I write (September 17th, 1872) he has continued perfectly well.

Case 89.—*Hypogastric Neuralgia of Several Years' Duration; Violent Headache; Coldness of the Feet.*

Elisabeth F., aged fifteen, who was suffering from severe and frequently recurring pain in the hypogastric region, and very often from violent headache, was brought to me by her mother Dec. 6th, 1871. The hypogastric pain was experienced almost every day, and was so severe that sometimes when walking home from her work, instead of being a quarter of an hour, she was an hour on the way—often holding on to the railings lest she should fall. The pain was most prone to come on after tea. Eating or drinking too freely would induce it, so also would mental emotion: "if," her mother said, "she's too lively within herself it 'ill come on." Ordinarily, an attack lasted from twenty to thirty minutes. Almost from her birth she had been troubled with this pain. "When she was young," said her mother, "I was forced to strip her, and lay her before the fire, and apply hot flannels." When eleven years old she was an in-patient of the Great Ormond Street Hospital on account of the pain in question. No organic cause of the pain was discoverable, and I concluded that it was what is ordinarily called "neuralgic." The patient's bowels were

regular; she had not begun to menstruate; her feet were habitually cold. I treated her by means of the Spinal Ice-bag, applied in the dorso-lumbar region. The result is indicated in the successive reports which follow.

Dec. 12th.—She had only felt the hypogastric pain twice since the Spinal Ice-bag was first applied, and then it was *much* less severe than before. Her headache was also somewhat lessened.

Dec. 19th.—Had had no hypogastric pain and no headache whatever since the date of the previous report.

Jan. 2, 1872.—Having to go to business at an early hour in the morning, and finding herself free from pain, she had, during the previous fortnight, applied the Spinal Ice-bag only half the time I had prescribed: the hypogastric pain had recurred, however, only once, and then much more slightly than formerly; but she had had headache several times. She was requested to use the Ice-bag as at first prescribed.

Jan. 30th.—Had *slight* hypogastric pain during about thirty minutes Jan. 27th: this was the only time she had felt it since the date of the previous report. She said,—"My head is ever so much better." Her feet had become quite warm.

Feb. 20th.—Had had no return of pain of any kind.

March 27th.—Had continued absolutely free from headache, and had had the "old pain" only once since the previous date. The bowels continued regular, appetite good, feet warm, and she slept well. I requested the use of the Spinal Ice-bag to be continued, and prescribed—Pilulæ aloes et ferri, gr. v., omni nocte.

April 23rd.—Had only had the pain once, and then very slightly—"it soon," she said, "went away." Replying to my inquiry respecting her head, she said,—"Oh, I never hardly have a headache now." She looked extremely well.

May 28th.—Had had neither pain in the head nor pain in the hypogastrum since previous visit. She said she felt very much stronger than formerly, and she looked thoroughly robust and well.

I saw the patient again in July, when she still continued free from pain. I have not seen her since. An interesting feature in her case was her striking increase of beauty during her treatment. A like result is, however, often observable in cases submitted to the Neuro-dynamic treatment: it is especially observable in those cases in which either pain or slight tonic spasm of the facial muscles, such as obtains in many epileptoid cases, is a characteristic symptom.

CASE 90.—*Violent Crampy Pains in the Abdomen; Diarrhœa; Headache; Spine-ache; Faintness; General Coldness.*

Mrs. J., aged forty-nine, complained at the Farringdon Dispensary December 13th, 1871, of crampy pains in the abdomen, which were worst when she was in bed. They usually came on about midnight, after she had been in bed two hours, and which by their violence bent her double. They were soon followed each night by diarrhœa, which troubled her ordinarily about six times a night, sometimes even eight times. After she rose in the morning the bowels were usually moved about three times. During the day the disorder generally ceased, but recurred in the evening, in the course of which her bowels were moved about twice as a rule. The pain was slighter during the day, but did not wholly cease: she suffered also from headache and from general coldness,—the cheeks and extremities were markedly cold, the arms being clammy. The lower part of her spine, since she suffered from diarrhœa, "ached so," she said; she felt faint, but had never actually fainted. Her diarrhœa came on suddenly as she was carrying a heavy tray to the top floor of a lofty house about a month ago, and had continued ever since. She had been treated at the Gray's Inn Hospital during a fortnight, and subsequently at the Farringdon Dispensary, where I prescribed for her the ordinary diarrhœa mixture supplied by the Dispensary, and afterwards sulphuric acid in full doses, each of which contained half a grain of quinine. Her pulse was remarkably feeble—84; menstruation ceased five years previously. There was extreme tenderness on pressure along the spine between the scapulæ, and from about the eighth dorsal vertebra down to the sacrum. Tongue clean; appetite "middling." She was directed to apply ice along the whole spine 120 minutes three times a day.

December 19th.—The pains were quite abolished; the motions had become much more solid; she rose twice the previous night, once the night before, and the night before that not at all; no motions at all in the day-time since using the ice, which, she said, "I fancy draws me to sleep." Whereas her sleep was formerly considerably broken, she now slept quite soundly, and didn't wake till nearly morning; her appetite was better; she stooped with pain no longer; her forehead, cheeks, and extremities had become quite warm; all clamminess was gone; her feet, formerly "like stones," felt now "nice;" all feeling of faintness was also gone; she had no aching whatever of the spine; pulse 90.

January 4th.—She used the ice twice only after last visit. From that time the bowels had acted quite regularly—once a day only,

and not at all during the night; she had remained quite free from pain; had continued warm, feet included; no faintness; had been to work, which she had not been before, having "no strength in her;" her headache had quite ceased; the tenderness of her spine was strikingly lessened; pulse 88; skin warm. She felt altogether well, and the treatment was finally discontinued.

CASE 91.—*Facial Neuralgia; Neuralgia of the Four Limbs; Infra-mammary Pain; Spine-ache; Impairment of Sight; Tenderness of the Scalp; Feeble Appetite; Constipated Bowels; Leucorrhœa; Coldness of the Feet; Excessive Tenderness along the Spine.*

Louisa N., aged twenty-three, married, came to the Farringdon Dispensary January 24th, 1872, when suffering from severe and prolonged neuralgia in various parts of the body, her face and head being especially painful. The facial neuralgia was chiefly on the right side, though latterly also affecting the left, and extended over the face and temple. The pain, which was most continuous and most acute just outside the outer angle of the right eye, was of a shooting, darting, and throbbing character. On one occasion its severity had caused her to lose her consciousness. She was sometimes, though rarely, free from *severe* pain during a whole day; was often free during a few hours, but had always *some* pain, though it might be so subdued that she almost forgot it. She had severe attacks on an average four days out of six, and when the paroxysm came on it lasted until she fell asleep at night. During its continuance the eyes were full of tears—the right especially so. After the subsidence of an attack the scalp was so fearfully tender, that she could not bear it to be touched; it was, however, always tender more or less. After each attack the right eye ached severely.

Of the neuralgia of the limbs, that of the right arm and elbow was especially severe—the left arm was only occasionally affected. The pain in the lower extremities recurred every day, and attacked chiefly the front of the thighs and also the calves. Often when she walked she felt as if she would fall. Her vision had become much impaired, that of the right eye most so; she could not read pica type with either eye; she slept fairly well when free from pain, but heavily; appetite feeble; bowels very constipated—three or four days usually passing without action; she had had leucorrhœa several years, also extreme coldness of the feet.

The trigeminal neuralgia had afflicted her between seven and eight years, the spinal pain about seven or eight months, and the pain in the left side about four months. She had been a patient

at the Surrey Dispensary, at Guy's and at St. Bartholomew's Hospitals, and had been treated by a general practitioner, who told her she had "a worm on the brain"!

My treatment in this case by the Neuro-dynamic method involved the use of both heat and cold, the application of which was modified in accordance with the changes occurring in the symptoms of the patient. At the end of a week the patient reported a decidedly increased warmth of the feet, a lessening of the leucorrhœa, and an improved action of the bowels.

February 7th.—The patient reported that the pain beneath her breast had left her, and that during the previous four days she had had no pains in her limbs. The bowels having become less active again, I prescribed aperient pills.

February 21st.—The patient stated that the pain had shifted from the angle of the eye to the side and top of the head; that the paroxysms had become very much less severe—only one severe one having occurred within the previous fortnight. Lachrymation of both eyes had quite ceased; the pain between the shoulders had much lessened, and that below the left breast had not returned. The bowels had again become more regular; the vision had perceptibly improved. She added,—"I have been able to do a little work this week." On this occasion I prescribed Ferri et quinæ citratis, gr. iij., ter die, the pills being used, if needful, as before.

March 6th.—The patient informed me that the pain at the angle of the eye had only recurred at times, and then very slightly; that the pain at the side and top of the head had been absent for days together; that when it did recur, it also was slight; that she had had no severe attack since last visit; that she had been quite without pain in the arms and legs for a full week; and that neither the pain between the shoulders nor that below the left breast had returned. The bowels had become quite regular, the feet quite warm again, she had scarcely any leucorrhœa, and her vision had so much improved that she could read test-type No. 3 quite distinctly—even with the right eye.

March 20th.—She said,—"Until Monday," the 18th, "I've kept wonderfully well—more so than I've been for years." The wind then changed to the North, and after that "the pains came very sharp, but not so continual," and her head felt heavy. Her bowels continued regular, without the aid of aperients, and her feet continued warm. The tonic was omitted, the Neuro-dynamic treatment being continued.

April 14th.—During the eighteen days preceding this date she was free from all pain whatever. It was then quite eight years since she had had a like experience. Her bowels continued

regular, and the leucorrhœa had become extremely slight. I prescribed,—Ammonii bromidii, gr. v., ter die, and the spinal application as before.

May 22nd.—Since the previous date she had had some pains occasionally, but when present they were less severe, and of shorter duration than formerly, and during the last ten days she had again been free from pain altogether. Her leucorrhœa had ceased; her bowels continued regular; and her feet, she said, were "always warm."

At this date her husband entered into a business engagement at Manchester, and, as she left London with him, I never saw her again.

CASE 92.—*Nephralgia; Acute Nephritis; Dropsy; Nausea and Vomiting; Constipation of the Bowels; Headache and Melancholy.*

Julia K., aged thirty, married, consulted me February 21st, 1872, when she complained of having suffered during the previous three weeks from headache, great pain across the loins, accompanied by a feeling of great heat, and from nausea and vomiting. The scalp, face, hypogastric region, and the legs and feet were swollen—the latter being greatly so, and also œdematous. The bowels were constipated—moved only once in two or three days. The urine was loaded with albumen. She slept badly, and was depressed and melancholy. The patient had, on several occasions during some weeks, walked in her sleep about four months previously. She had scarlet fever when twelve years old. I prescribed the application, at least three times a day, of two Lumbar Ice-bags,—one of them to be placed across the loins, and the other along the spine, immediately above it—and the following medicine:—℞ Pulveris jalapæ compositi, ℈j., cras mane; ℞ Misturæ ammoniæ acetatis, ℥j., quartis horis.

February 26th.—Used ice three successive days as ordered—three times the first day, and twice on the second and third days. She felt that the applications would have been more agreeable if the cold had been more intense. From the time the ice was first applied the pain across the loins gradually lessened, and yesterday had wholly ceased; the legs and feet were very much less swollen and œdematous; she had become quite free from headache and from sickness; her bowels had become open daily; she slept very much better, and felt in much better spirits; the amount of albumen in the urine was lessened in a striking degree. I advised her to continue the use of the ice as before, to take a Turkish bath every other day, and to take no medicine.

March 4th.—She reported that she had had no return of the pain in the loins, except when she exerted herself, and then but slightly; that she had had no headache at all, and that she felt her brain light and clear. The dropsy had completely disappeared both from the abdomen and extremities. She thought, however, that she was becoming both thinner and weaker, and she complained of a "feeling of oppression" between her shoulders. The amount of albumen in the urine had now become extremely slight. I advised her to continue the ice and the Turkish baths as before, and to take Olei morrhuæ, ℥ij., bis die; also Ferri et quinæ citratis, gr. v., bis die.

March 11th.—Had had only one Turkish bath since last visit. The amount of albumen in the urine was again lessened. I requested the same treatment to be continued unremittingly.

March 18th.—Had had no pain whatever since last visit, and was in excellent spirits; felt decidedly stronger; her bowels had become very regular; there was no perceptible swelling anywhere, and the urine did not contain a trace of albumen. She reported, however, that she did not sleep very well at night. I requested the treatment to be continued as before.

April 2nd.—The pain in the loins had wholly ceased; there was no trace of albumen in the urine; and her appetite was very much improved. She complained, however, of pain between the scapulæ, which she thought had been caused by fright the previous week, when her son fell and cut his head. I requested the medicines last prescribed to be continued, and the application of the Spinal Ice-bag along the whole spine during half an hour twice a day.

April 15th.—The patient reported herself quite free from pain, and quite well in every respect. The urine was again found quite free from albumen. Treatment discontinued.

I have seen this patient several times since, and she remained quite well.

Case 93.—*Gastralgia; Vomiting; Severe Cough; Loss of Appetite; Emaciation.*

Phillip F., aged seven, was brought to me at the Farringdon Dispensary 22nd February, 1872, by his mother, who said he suffered every day from a severe pain in his stomach. The pain was especially violent in the morning and evening, and often caused him to cry aloud. It lasted, when most severe, from 60 to 120 minutes. It was generally followed, and seemingly terminated, by vomiting, which continued from ten to fifteen

minutes. The ejecta consisted of "a sort of thick phlegm." He was also troubled with "a very bad cough indeed," which was much the most persistent and distressing during the night: it was not accompanied by expectoration; and neither percussion nor auscultation yielded evidence of pulmonary disease. His appetite was extremely feeble; he was notably emaciated, and looked old for his age; his countenance was pinched, and presented an unmistakable aspect of suffering and exhaustion. He began to suffer in the manner described, without any assignable cause, about five months previously, and had continued to do so until I saw him. He was treated solely by means of the Spinal Ice-bag.

March 5th.—His mother reported that since the first day of treatment the pain and vomiting had ceased entirely; that the cough was already much lessened; and that his appetite had improved.

March 19th.—Neither pain nor sickness had recurred. His appetite had greatly improved: he asked for food, his mother said, several times a day.

April 2nd.—Had had no pain whatever, and, his mother said, "has continued quite free from sickness, except when his father has beaten him (!): then he has sometimes become sick." His cough had quite ceased. He slept well, and his appetite had continued good.

April 30th.—Had remained quite free from pain and sickness, but had coughed a little during the preceding week. The use of the Spinal Ice-bag was continued, and he was ordered to take Ol. morrhuæ, ℥j.; vini ferri, ℥j., bis die.

June 14th.—Had passed several weeks without experiencing pain, cough, or sickness, and was dismissed from the Dispensary quite well.

Case 94.—*Brachial Neuralgia; Hyperæsthesia, accompanying a Lichenous Eruption; Bronchial Catarrh.*

March 9th, 1872.—I was consulted by J. C., male, aged fifty-one, who, after being troubled for some weeks with bronchial catarrh, and a lichenous eruption, which extended over the whole of the front of the chest, and which was intensely irritable, began, in the latter part of February, 1871, to suffer from neuralgia located in the left shoulder and arm. The pain, which was of a continuously gnawing kind, rarely extended below the elbow, but sometimes it reached to the fingers. It was much the most severe in the night, and when the patient lay on his left side it

seemed to increase : it was appreciably augmented by distressing emotion. During the last week of February and the first of March the pain recurred every night. The general health was fairly good ; but the patient had occasional, though slight, attacks of gout. I advised him to take a Turkish bath weekly, and to apply ice along the whole spine during two hours each evening. He took a bath in the evening of the day he consulted me : though the bath seemed to benefit him generally, it augmented the irritation of the eruption of the chest so intensely that it became, he said, almost intolerable. Passing the hand over it increased it in a striking degree. In this condition he went to bed, and applied the Spinal Ice-bag as directed by lying upon it. He declared that almost immediately—within two or three minutes—all irritation was absolutely gone, and that he could pass his hand freely over the whole of the front of the chest without producing any unpleasant sensation whatever—in fact, without producing any sensation different from that caused by passing the hand over the surface of any other part of his body. The irritation did not recur, and by the 16th of March had disappeared.

The bronchial mucus, which for some time previously had been excessively copious, and had caused frequent coughing in order to expectorate it, rapidly lessened in quantity, and at the end of the week of treatment had ceased to be troublesome.

The neuralgia was not felt at all during the night of the 9th, and troubled the patient but very slightly afterwards at any time, until the 16th, when he experienced a great vexation, which quickly brought on the pain again, to be again subdued, however, by a fresh application of ice.

Case 95.—*Gastralgia, with Prolonged Vomiting ; Headache ; Coldness of the Feet.*

R. B., male, aged twenty-six, came to the Farringdon Dispensary March 13, 1872, and complained of frequently recurring attacks of severe, crampy pains in the abdomen. The pains lasted from four to twelve hours—most frequently from six to eight hours. They both came on and subsided gradually. The pains were usually accompanied with vomiting, which, with slight intervals of relief, lasted from two to four hours. On the occasion of his last attack the vomiting continued three hours. On one occasion he was confined to bed four days by the length and severity of an attack. If he took no aperient medicine his bowels were opened, on an average, about once in three days, and his attacks seemed prone to occur after the bowels had been confined about three days, but they

also sometimes occurred soon after the bowels had acted. Sometimes he had only a day's freedom from suffering; but generally several days, and not infrequently a week. He also suffered from severe headache once or twice a week, and habitually from extreme coldness of the feet.

He was quite well until October, 1869, when he had an accident with a chisel, by which the left thenar eminence was deeply stabbed: the wound healed rapidly. About two months afterwards, when waking in the mornings, he experienced violent "bilious" headaches, after which he vomited what he had eaten the day before. These attacks, which came on first in February, 1870, were as a rule weekly, and generally occurred on Sunday. Wondering whether drinking a little beer on Saturday night caused them, he left off the beer, but they came just the same. Then he became troubled with a "nervousness—a violent beating of the heart, and noises in the head;" the attacks of this kind were sudden in their onset, and lasted only a few minutes. On account of them he was treated at University College Hospital during three months, by Dr. Bastian, with temporary benefit. Finally, the agonising enteralgia and vomiting, for the relief of which he applied at the Farringdon Dispensary, gradually supervened: the intervening stage of the change being backache, from which he suffered severely, and constipation, which gradually became established. He had had several attacks of hæmoptysis, which began about the time the hand was wounded, and continued until May, 1871. He applied at the Dispensary last spring on account of this affection: I treated him by means of sulphate of beberia, and the hæmoptysis had not recurred since. He was, I believe, so alarmed by finding himself spitting blood that he was led to mention this symptom only when he first consulted me.

When he applied to me concerning the troubles of which he complained March 13th, 1872, I prescribed Olei morrhuæ, ℥ij., bis die, and the application of the Spinal Ice-bag. Thirteen days afterwards he informed me that since the beginning of the treatment he had not had one attack of enteric pain; that he had had headache less frequently, and that, though the fæces continued hard, his bowels had become open daily. He said he was much surprised to find that the ice was very agreeable.

April 13th.—He reported that he had had one attack of vomiting, but that he had had no recurrence whatever of the pain.

April 23rd.—He was still without any return of pain, and had not vomited again. About a fortnight previously he was unable to use the ice more than once a day, and his bowels became constipated again; after he resumed the use of the ice as first pre-

scribed the action of his bowels again became normal. His appearance was wonderfully improved.

May 7th.—He continued free from enteralgia, vomiting, and headache; but having a slight cold in the head he had left off the Spinal Ice-bag during the previous four or five days, and, he said, felt the need of it. I asked him what he meant by saying he felt the need of it: he replied,—"Why, sir, I feel that I like it—I feel that it braces me up."

This patient, whom I last saw in December, 1872, had had no recurrence of the disorders from which, before treatment, he had so grievously suffered.

CASE 96.—*Gastralgia; Aching and Cramps of the Lower Extremities; Headache; Life-long Vomiting and Diarrhœa; Fits of Unconsciousness; Extreme Coldness of the whole Surface of the Body.*

James W., aged sixteen, who was brought to the Farringdon Dispensary by his mother March 18th, 1872, complained of frequently recurring attacks of "excruciating, crampy pains" in his stomach, accompanied by pain at the back of the head, vomiting, and diarrhœa. The attacks of "agony in the stomach," as his mother called them, were most prone to come on at one or two o'clock a.m., and always lasted several hours—often till one or two p.m. At the end of the paroxysm his prostration was extreme. These fits of pain usually occurred two or three times a week, or every second or third day, but sometimes more frequently: during the nine days immediately before I saw the boy he had been, his mother said, in continuous pain. The pain across the back and base of his head was less severe than the pain in his stomach, but more continuous: it very often lasted for days together. He often suffered from it without being sick, but he was never sick without having at the same time pain across the back of his head, and this pain was always much the most severe during his attacks of gastralgia and vomiting. The cramps in the lower extremities of which he complained were most severe in the toes and in the calves of the legs. He was also troubled with severe aching of the knees. Vomiting or nausea accompanied the gastralgia during the whole time of each attack: the vomiting recurred with the most distressing frequency; he was unable to retain anything in the stomach more than a few minutes, and between the paroxysms of vomiting he felt miserably sick. The diarrhœa from which he suffered was almost incessant. When the food which he took did not provoke vomiting it seemed to act almost always as an excitant of the bowels, causing diarrhœa. It

was a common experience for the bowels to be moved nine or ten times during the day, and several times during the night, the food seeming to pass in an undigested state. The patient also suffered from epilepsy, including not only ordinary epileptic giddiness, but also a very pronounced form of *petit mal:* his eyes presented a fixed aspect; his features, which were in no way distorted, remained placid, and he looked as if in reverie during a variable length of time—from several minutes to half-an-hour, consciousness being wholly absent meanwhile. He did not fall during these attacks, but sometimes reeled. They generally recurred every day—often several times a day. His sleep was very disturbed and unhealthy, even when he was free from gastric or enteric troubles: he often talked in a rambling manner as if delirious, or rolled his eyes about unconsciously. The whole surface of the body was remarkably cold, his extremities being most especially so, and his hands were purple. Sometimes he had severe shivering fits. Pulse excessively feeble—104. He was greatly emaciated, pale, extremely weak, and seemed very melancholy. When free from sickness he had a voracious appetite, and was extremely thirsty. The whole spine was remarkably tender, the third, sixth, seventh, eighth, and ninth dorsal segments being most especially so.

The boy said he had suffered in the manner just described ever since he could remember, and his mother, an intelligent and seemingly truthful woman, whom I cross-questioned very searchingly, made the surprising statement, which she persistently adhered to, that her son had suffered much in the same way *ever since his birth!* And both mother and son said that the longest period that they could recollect him to have remained free from diarrhœa was five days at a time, "and then," his mother added, "it was when he was taking diarrhœa mixture." He suffered less continuously from sickness than from diarrhœa, but the sickness was always accompanied with pain, both in the abdomen and at the back of the head. His mother thought that he had always suffered at the back of his head, and mentioned that he had large abscesses over the occiput on several occasions. The boy was born in the month of July, and, notwithstanding the warm weather, his skin was astonishingly cold and blue. He was suckled till he was two years old; but as an infant he was so emaciated by diarrhœa and vomiting that when his sisters carried him in the street they used to be stopped by persons who were struck by the child's emaciation and blueness. He was four years old before he could sit upright, and he had entered on his sixth year before he had cut his first tooth or could walk alone. During the two years immediately before I saw him his condition had become worse in all respects, the gastralgia especially being

much intensified. He had been an out-patient at the German Hospital and at Bartholomew's Hospital many times, he had also been at the Victoria Park Hospital, and had been treated by several private medical practitioners, but always without receiving any substantial benefit.

I prescribed in the first instance the application of the Spinal Ice-bag along the spine, from the middle of the cervical region down to the middle of the lumbar region, during three quarters of an hour three times a day.

On March 26th, his mother reported that his vomiting had lessened, and that his head was better. But as he suffered from toothache, which began on the 21st, the Spinal Ice-bag was not applied after the 22nd. I requested it to be re-applied during an hour three times a day, and that on each occasion it should be brought quite close up to the occiput.

April 1st.—The vomiting had again lessened, but he was still much troubled with nausea. The gastralgia was still severe, but like the vomiting, recurred less frequently than before. Pain in the back of the head had also lessened. The cramps in the toes and in the calves of the legs had quite ceased, but his knees still ached. The boy said,—"I am less giddy, and can keep more to myšelf:" by the latter phrase he meant that he did not so often pass into a state of unconsciousness, or of "deep thought," as his mother called it. She said he slept much better, and that she found him looking brighter, except when he was "suffering considerably." The diarrhœa was only slightly, if at all, lessened. I requested the treatment to be continued as before.

May 2nd.—The vomiting quite ceased April 3rd; the nausea, which gradually subsided, was no longer felt after about the middle of April; during the second half of that month he had no diarrhœa whatever—the bowels being moved only once daily, and only so much gastric pain as to be described by the boy himself as "just a trifle, and not often." His mother said his attacks of "deep thought" were much shorter and less frequent, and that everybody noticed how much better and brighter he looked. She added,—"He seems to feel so much stronger: he can do things so much better than he used to do." His feet had become continuously warm; and his appetite was excellent. The application of the Spinal Ice-bag was ordered to be continued each time until the bag should cease to be be cold.

May 7th.—No one of the symptoms previously reported as having subsided had recurred; and now every vestige of gastric pain had vanished; he had become "warm all over," the feet being especially, as he said, "nice and warm." He looked fresh, full in the face—florid even; his expression was wonderfully brighter and more intelligent, and his general strength had greatly increased.

There now remained only two elements of the original malady unsubdued: headache and *petit mal;* but these had become so comparatively slight that both the mother and father of the boy considered him cured, and thought it unnecessary to continue the treatment any longer. The pain across the back of the head had indeed ceased, and the "little headache" which he still had was "chiefly in the forehead"—a result, I apprehend, of the great and comparatively sudden increase of blood-supply to the previously starved cerebrum. He was now troubled with *petit mal* or fits of unconsciousness about once a day only, instead of several times as heretofore; and whereas they formerly lasted from several minutes to half-an-hour, they now often lasted only a few moments, and at most a minute or two.

The progress of this remarkable case was watched by my surgical colleague at the Farringdon Dispensary—Mr. John Waters, who was much impressed by the effects he witnessed. It is greatly to be regretted that the parents of the boy found it inconvenient to bear the expense of a daily supply of ice for him until his *petit mal* had been, as I believe it could have been, completely cured.

CASE 97.—*Infra-mammary Neuralgia; Pain between the Shoulders and along the Left Arm; Headache; Lumbar and Hypogastric Pain, together with Sickness, at the Menstrual Periods; "Faint Feelings;" Chronic Cough, with Copious Expectoration; Leucorrhœa; Extreme Coldness of the Feet; General Tenderness along the Spine.*

E. C., aged twenty, a housemaid, came to the Farringdon Dispensary March 20th, 1872, to obtain relief from pain in her left side. The pain was seated immediately below the left breast, and was very severe and continuous. She said,—"Continually something seems as if it went drag—drag—drag." Often the pain kept her awake a long time each night: during the two nights immediately before I saw her it did so. She was also much troubled with pain between her shoulders, and extending down her left arm. It was intermittent—coming and going at irregular intervals. She suffered from very severe frontal headache three or four times a week; and at every catamenial period she had intense pain in the lumbar and hypogastric regions during the whole of the first day, when she generally felt sick and often vomited. Besides these painful affections, she was troubled with a disorder called by herself "nasty faint feelings," which she described by saying,—"I feel something hot coming over me, and

then I grow very cold." This feeling seemed to come most frequently as if caused or induced by the infra-mammary pain, and, according to her sensations, was directly connected not only with it, but with the spinal cord: after the dragging pain in the side had lasted some time, "then," she said, "I have those nasty faint feelings, and then it goes to my back."

She had a considerable cough, which troubled her both winter and summer, and she expectorated "a lot of phlegm"—so much that she was "choked nearly in a morning the first thing." Her appetite was fairly good, but she did not enjoy her food. Tongue clean; bowels regular. The catamenia recurred every third week, and were fairly copious. She suffered from leucorrhœa, which was considerable, and which was markedly increased before each catamenial period. Her feet, she said, were always very cold: her mother added,—"They're like icicles now, sir." Pulse 75. The whole spine was extremely tender.

Her chief trouble—the infra-mammary neuralgia—had lasted twelve months, and at last disabled her from continuing at her work.

She was treated exclusively by means of the Spinal Ice-bag, applied in the first instance along the lower two-thirds of the spinal cord. After five days of treatment she reported that her headache was lessened, and that the pain between the shoulders and along her left arm had ceased; but that each time she applied the Spinal Ice-bag she felt a flushing in the face and giddiness, which came on about ten minutes after the ice was first applied, and lasted about twenty minutes. She also felt an "aching pain" across the lower and front part of the chest after the Spine-bag was removed. I then prescribed the application of one cell of the Spinal Ice-bag along the lower dorsal and upper lumbar region, and Pilulæ hydrargyri cum ext. colocynth c°, gr. v., p. r. n.

April 3rd.—The infra-mammary pain had already quite ceased; headache had occurred only once during the preceding week; the leucorrhœa had lessened; and the patient slept much better than formerly.

May 1st.—The headache had not recurred; the "faint feelings" had quite ceased; her cough had almost wholly subsided, and she expectorated "scarcely any phlegm at all;" during her last catamenial period she "hadn't a quarter so much pain" as she had formerly had, and she felt no sickness and no nausea; she had no longer any leucorrhœa, and her feet had become comfortably warm. Feeling well, she resumed her employment, and the treatment of her was discontinued.

CASE 98.—*Intense Headache; Delirium; Pain in the Abdomen; Incessant Vomiting in consequence of Pregnancy; Extreme Weakness and Emaciation.*

April 16th, 1872, I was requested to visit Mrs. P., aged twenty, who was suffering so severely from cerebral disorder and vomiting which her ordinary medical attendant seemed unable to control, that she was scarcely expected to live. When she was able to speak coherently she complained of intense pain in the head—"as if it would split open," and also of severe and incessant pain in the hypogastric region. She was vomiting or retching almost incessantly—night and day; she could retain and assimilate nothing; even water was being withheld from her, because if she took only a tablespoonful of it her retching immediately became more distressingly violent. Her pulse was about 60 per minute, wiry, irregular, and intermittent. Her eyes were sunken and dim; her countenance had lost much of its usual expressiveness; her mind rambled incoherently, and again, at brief intervals, she seemed to be normally conscious; and she was so wasted that she seemed mere "skin and bone": in short, she was sinking bodily and mentally from sheer starvation. Her head, and, indeed, the whole surface of her body, were hot and dry, and the skin on the palms of her hands was cracked, more or less, in various directions, owing to its extreme dryness. There was no diarrhœa. The patient had always enjoyed good health until she married at the end of 1871. When I first saw her an interval of six weeks had elapsed since she had menstruated; and three weeks after menstruation ceased she began to be sick. The sickness soon became incessant; being unable to sleep or rest at night she refrained during several nights from going to bed at all; and in the course of her period of sickness she had several attacks of maniacal unconsciousness. The prognosis expressed to her father by her medical attendant was of the gravest kind: even if she lived, which was scarcely to be expected, she would, he believed, be permanently insane, and it would be necessary to confine her in a lunatic asylum, as was the case of another of his patients whose sufferings began in the same way (!). He applied a blister over her stomach (!) and the sore it produced was still open when I first visited her.

Seeing how she was suffering for want of water I gave her some: it made her vomit immediately with great violence. As quickly as ice could be procured I applied it (between three and four p.m.) in a Lumbar Ice-bag across the occiput, from ear to ear, in order to soothe the brain; and then, having filled the

upper two cells of a twenty-inch Spinal Ice-bag, I applied them along the spine from the fourth lumbar vertebra as far upwards as they would reach, viz., to the fifth or fourth dorsal vertebra : in about ten minutes the patient was completely soothed. I then removed the bag from across the occiput, but left the other one applied along the spine : in ten minutes more she was fast asleep. Having absented myself for a time, I returned at 5·30 p.m., and found that she had been sleeping soundly during nearly the whole time of my absence. She had taken water twice, and had kept it the second time. As the ice had melted I requested the bag to be replenished, and I immediately applied it again. She soon fancied some tea, which I had had carefully made and mixed with an equal quantity of milk : of this she drank a breakfast cupful, and kept it. Her pulse had risen to 69, and had improved in quality. I requested the Spinal Ice-bag to be applied continuously, a fresh supply of ice being put in it every second hour unless the patient should be asleep.

April 17th, 4 p.m.—The Spinal Ice-bag had been applied as directed. The sickness had almost wholly abated : she had been sick only once, viz., after taking some water in the night. She had slept nearly the whole of the night, and a considerable part of the day. An enema which was given brought away a large accumulation of fæces. She afterwards took a cup of tea, with a large proportion of milk in it, and again kept the whole of it. She was altogether wonderfully better, and since her sleep the previous day had not once lapsed into delirium. I now directed the Spinal Ice-bag to be applied four times a day, and each time to be kept on until the ice in it should be melted, unless, meanwhile, it should cause discomfort.

April 18th.—The ice had been used as directed. She had taken tea with milk, barley-water—rather thick, and a small piece of sole, and had retained the whole. The pain in her head had very much lessened, and she was able to sit up and have her hair combed out. Her pulse, which was 68, had become fairly steady.

April 20th.—She was sick once, but only slightly, on the 19th —not at all afterwards. She ate some sole and took milk freely without any inconvenience. She bespoke roast mutton for her dinner on the morrow—Sunday. Her pulse was 66, soft and steady; and her hands, instead of being dry and cracked, had become healthily moist. I directed that the Spinal Ice-bag should be applied before breakfast during an hour, after dinner and tea during three quarters of an hour, and at any other time if she should become sick.

April 24th.—On the evening of the 20th she had oysters for supper, and enjoyed them. On the 21st, Sunday, she felt sick at

breakfast : the Spinal Ice-bag was applied, and the sickness was rapidly subdued. She dined at the family table, and was so well that she played the piano to her father afterwards. On the 22nd she continued free from sickness. On the 23rd she went down stairs to breakfast, and went out afterwards. At the date of this report, the 24th, she had had no sickness since the morning of the 21st ; her bowels had acted each day ; she had been free from both headache and hypogastric pain during several days : she declared herself "all right," and, indeed, looked not only quite well, but several years younger than she appeared to be when I first saw her. I advised her to re-apply the Spinal Ice-bag if the symptoms should recur, and took my leave.

CASE 99.—*Gastralgia ; Intense Backache ; Prolonged Vomiting and Diarrhœa ; Leucorrhœa ; Epilepsy.*

April 26th, 1872.—I was requested to meet in consultation the medical attendant of Mrs. A., aged about thirty, who was suffering from a combination of troubles, which the drugs that had been prescribed seemed unable to alleviate. She had great pain, much intensified during vomiting, at the cardiac orifice of the stomach, and extraordinarily severe pain—"something beyond bearing," she said, along the dorso-lumbar region. It was most severe in the mornings and evenings. She suffered from retching, vomiting, and diarrhœa almost incessantly, and from leucorrhœa also : she was, moreover, a victim to epilepsy.

On an average she was troubled with retching or vomiting seven or eight times a day. "If one merely talked about dinner," her husband said to me when I last saw him, "let alone having it, she began to retch." The mere smell of it made her do so. The ejected matters were not infrequently tinged with blood; and sometimes she threw up small dark clots of blood. Often on waking in the morning she found her mouth bloody, and the pillow stained with blood.

Her bowels never acted naturally : they were always relaxed, and though sometimes she might pass a couple of days fairly free from diarrhœa, they were often moved ten or twelve times a day. Unlike the vomiting, the diarrhœa was accompanied with but little pain.

The attacks of vomiting, accompanied with gastric pain, and the diarrhœa, on account of which my advice was requested, began a-fresh at the end of October, 1871. From that date until I saw her she had not passed a week free from them. Her husband said,—"I don't think she ever had a day free from them." The

things her stomach was least prone to reject were tea—sometimes with eggs beaten up in it—brandy, bread and butter, and occasionally—when she fancied it—some crab or lobster: meat and vegetables she could not digest at all.

Her "fainting-fits" or epileptic attacks were wont to recur, at the period when I was first consulted, from three or four times a week to three or four times a day. Each attack lasted generally about fifteen minutes, but sometimes much longer. During an attack she became rigid, sometimes the extensor, and sometimes the flexor muscles being most powerfully affected; her jaws were firmly clenched, and in many of her attacks there was violent opisthotonos. She generally lost her consciousness entirely; but she thinks that on rare occasions she did not wholly do so. When recovering she always complained of "a shivering feeling."

In her girlhood, and on the very day she began to menstruate the first time, two girls dressed themselves up in white sheets, and so frightened her that she instantly fell in a fit, the catamenia suddenly stopped, and during many months afterwards she had several fits *every day*. Gradually the fits recurred at more distant intervals, until about a year before her marriage, which took place when she was twenty-one years old, about nine years before I saw her, she had a fit only occasionally—"once in one or two months." They subsequently became more frequent again, were especially frequent during her last pregnancy, and, as already mentioned, up to the time when I was requested to see her.

During the several years which elapsed between the time of her fright and that of her marriage, she menstruated only twice, but had been long afflicted with profuse and continuous leucorrhœa. In the course of her first pregnancy she suffered from retching, vomiting, and diarrhœa during about three months, and had many fits. During her second and her third pregnancy she suffered in the same way. During her fourth pregnancy she was extremely nervous: she started, jumped, looked under the bed each night—fearing someone might be beneath it, and suffered from sickness, diarrhœa, and fits, even more severely than on former occasions. But during *the whole* of her fifth pregnancy—her last before my advice was requested—she suffered from sickness and diarrhœa continuously, and from fits with terrible frequency. Her sickness and diarrhœa ceased only with her delivery; and then, after an interval of relief, her sufferings began again, though she was not again pregnant, at the end of October, 1871, as already mentioned.

Up to the time I was consulted her medical attendant had tried everything he could think of in the hope of relieving her, but without success. I treated her solely by the Neuro-dynamic method, applied the Ice-bags myself in the first instance, gave

very careful instructions to her sister concerning their re-application, and took my leave. This was on the 26th of April. On the 27th she continued sick, but less violently than before; on the 28th she vomited once, and then both vomiting and retching ceased entirely. Her gastric pain subsided along with her retching. The diarrhœa was gradually subdued, and at the end of the sixth day of treatment also completely ceased, and did not recur. Meanwhile her backache and leucorrhœa had markedly lessened; and after the first application of the Ice-bag she had not a single fit! The treatment which effected these extraordinary results extended only over nine days, and was then wholly discontinued.

I saw this patient again June 10th, after the treatment had been discontinued upwards of a month: she continued free from gastric pain, sickness, and diarrhœa, although she felt threatenings of the return of the latter; she was still troubled with leucorrhœa—but not profusely, and with some backache; she feared she was again pregnant. From the time I first applied the Spinal Ice-bag she had not had one fit. Her appetite was excellent, and she felt, she said, better than she had done for years: she added,—"I now feel that life is worth living." Having given her further directions how to proceed in order to prevent fresh invasions of her enemies, I took my leave, and never saw her again.

CASE 100.—*Sciatica; Shooting Pains in the Head; Giddiness and Mental Confusion; Deficient Catamenia; Periodical Shivering; Coldness of the Feet.*

May 11th, 1872, I was consulted by Mrs. T., aged thirty-eight, whose chief malady was sciatica—on the right side. The pain extended along the line of the sciatic nerve into the popliteal space, and thence down the back of the leg. The pain over the outer side of the thigh was especially severe. Her suffering came on in paroxysms, which were generally brief in the day-time, but intensely severe at night. She usually went to sleep soon after going to bed, and then after a short time was woke up with the onset of a paroxysm. She was in the habit of getting up and walking about the room when the paroxysms came on; by doing so she seemed to bear them better, and sooner obtained relief from them, she thought, than when she remained in bed. Often she got up for the same purpose several times in one night. She had been suffering in the manner described about six weeks when I first saw her. In the previous autumn she had suffered in the same way about two months, and in 1869 about three months. She also complained of giddiness and of "sudden attacks of confusion:" she said,—"When they come on I feel as if I were

going to lose my senses." The giddiness troubled her frequently, but very irregularly in respect to time—sometimes several times in one day, sometimes not at all; the "confusion" occurred two or three times a day—"sometimes it was just momentary, sometimes it lasted a little longer."

The catamenia recurred regularly, but lasted only about two days, and were very scanty. She gave birth to a child seventeen years previously, and three months afterwards, while still suckling, the menses recurred very profusely; and when, afterwards, she weaned the child, they began very notably to decrease, and ever since had continued remarkably deficient. About a week before the reappearance of the catamenia, she was on each occasion, she said, "taken with cold shivers," which recurred frequently each day till the flow came on. Her feet were generally cold—"often very cold." Pulse 72; bowels regular.

The treatment in this case was throughout and chiefly by means of the Spinal Ice-bag: during the first fortnight she took no medicine.

May 25th.—The paroxysms of sciatica were already lessened, those occurring in the day most notably so.

June 1st.—Her head was much better: "nothing like so much giddiness." But she still had shooting pains occasionally. Her feet were certainly warmer." In addition to the use of the Spinal Ice-bag, as before, I prescribed—Potassii bromidii, gr. xv.; tincturæ conii, ℥xx; aquæ camphoræ, ℥j., omni nocte.

June 8th.—The paroxysms had become still less severe at night, and in the day-time she had only "just a little pain sometimes." Her head was altogether better, and her feet continued warm. I requested the Spinal Ice-bag to be continued as before, and to be used throughout her menstrual period.

June 14th.—The pain at night was very much lessened, and in the day-time she scarcely had any pain at all. Her giddiness had become much less frequent.

June 29th.—The sciatic pain had become so slight that she did not get up at night at all.

July 13th.—She had been quite free from pain every night during the previous week. She said,—"I just feel the pain a little at times in the day-time; it's only momentary—very trifling." She complained, however, of heaviness of the head. The Spinal Ice-bag was still continued, and instead of the medicine previously taken, the following was prescribed:—Ammonii bromidii, gr. x.; tincturæ calumbæ, ℥j.; aquæ, ad ℥j., bis die.

July 20th.—She had continued *quite* free from sciatica both by night and day, from pain in the head also, and almost entirely free from giddiness and confusion. She said,—"I think I may consider myself well."

August 3rd.—She had wholly ceased to feel giddy or confused, and said,—"My nights are quite delightful." She was requested to omit medicine altogether, and to continue the application of the Spinal Ice-bag twice instead of three times a day.

August 17th.—Her catamenia had recurred without being preluded by shivering, and were of brighter colour and slightly more copious than formerly; her feet continued warm; she had had no return of giddiness, confusion, or pain of any kind; she slept well, and felt quite well in all respects. Treatment was therefore discontinued.

December 10th.—The patient's husband informed me that since the date of the last report she had continued well in all respects.

POSTSCRIPT.

In confirmation of the views respecting the pathology and treatment of sciatica exemplified in the case last described, as well as of the doctrine, expressed at p. 230 *et seq.*, concerning the nature of the change induced in the nervous centres by the action of cold on the general surface of the body, I may mention an instructive fact experienced by myself. On the 28th November, 1872, while sitting in my consulting-room, which being large, is with difficulty kept agreeably warm in cold weather, I suddenly experienced, about 4 p.m., severe pain along the lower third of the spine. I felt cold generally; but the whole of the lower extremities were especially cold. Anxious to complete some work I was doing, I put a rug around my legs and continued at my desk. The pain persisted, and early in the evening any movement involving flexion of the spine increased the pain, and caused it to be felt more widely across the back. I then applied a Lumbar Ice-bag along the lower third of the spine, and before all the ice had melted the pain had very nearly ceased so long as I sat still. I then left London for the night. On reaching home, the back-ache had recurred, but in a subdued form; the whole of both the lower extremities ached severely, and I found that stooping, sitting down, and rising up increased the pain considerably both in the back and in the whole of the muscles of both hips. Knowing that during several days previously, and especially during the afternoon in question, I had allowed my feet and legs to become very cold, I concluded that I had "taken cold," and therefore, before going to bed, put myself in a warm bath, and remained in it at a temperature of 100° during about forty-five minutes. It seemed at the time to afford appreciable relief; but during the night the aching was considerable, and the next day was severe both in the back and throughout the extremities—the pain and stiffness in the hips being especially pronounced.

In the afternoon of that day I took a Turkish bath, sweated profusely, and again felt some relief; but on the following morning the aching, stiffness, and immediate increase of pain by movement were quite as great as before. I then began the regular use of ice—applying it to the lower half of the spine during several hours each day, the last application being after I went to bed at night. At the end of the first day the symptoms were markedly abated, and at the end of the fourth day they had completely vanished. On the following day I resumed my habit of taking a cold shower-bath each morning, and quickly after the use of the first bath the symptoms returned. Its use was again suspended, and the Spinal Ice-bag was re-applied twice that day. The next morning I rose quite free from pain and stiffness, and up to this time (December 21st, 1872) have continued so.

Now, in this case, although there is reason to believe that the symptoms were the effects of the influence of cold on the peripheral expanse of sensory nerves over the lower half of the body, the counteracting influence of heat, subsequently applied by means of both a prolonged warm bath and a Turkish bath to the whole of that expanse, failed to do more than effect a temporary amelioration; whereas cold, applied by means of the Spinal Ice-bag, to the central ends of those same nerves rapidly and completely cured the disorder. This experience is but one proof more added to the many already given that the condition precedent of pain is hyperæmia of the root of the algic nerve, and that, by removing that condition, the pain may be abolished. Moreover, in this case, as just remarked, there is reason to believe that the symptoms were induced by cold in the manner described: I feel assured that they were, and that no other cause is assignable. But if they were, then it is manifest that cold applied to the periphery of the body induced excitement and hyperæmia of the sensory cells of the spinal cord,—a result strikingly accordant with the views I have expressed, in contravention of those of Dr. Anstie, concerning the nature of the effects on the nervous centres of cold applied to the periphery of the body.

ERRATA.

Page 3, line 39, for "Aikin" read "Aitkin."
" 8, " 5, for "imflammatory" read "inflammatory."
" 10, " 2 and note, for "Maculloch" read "Macculloch."
" 52, " 14, for "McCulloch" read "Macculloch."
" 58, " 17, for "it" read "itself."
" 60, " 13, for "trocheanter" read "trochanter."
" 60, " 43, after the word "processes" insert inverted commas.
" 61, " 29, after the word "neuralgic" insert a comma.
" 62, " 29, for "phenomena" read "phenomenon."
" 64, " 7, insert after the word "suffering" "affects the crural much more rarely than the sciatic nerve."
" 64, " 11, after the word "type' insert a comma.
" 66, " 24, for "following" read "followed."
" 70, " 41, for "are" read "is."
" 73, " 35, for "of both" read "both of."
" 77, " 3, omit the word "only."
" 77, " 41, for "whereat" read "whereas."
" 77, " 42, after the word "disposed" insert "of."
" 80, " 43, for "anæthesia" read "anæsthesia."
" 86, 4th line of note, insert after "Hunde" "und."
" 90, line 19, for "impossibiltty" read "impossibility."
" 93, note, for "24" read "27."
" 107, line 14, for "disorder" read "disorders."
" 108, " 4, for "association" read "associated."
" 108, " 35, for "irrisistible" read "irresistible."
" 108, " 40, for "whieh" read "which."
" 116, " 39, for "Herschfeld" read "Hirschfeld."
" 121, " 31, before the word "sanguineous" insert the words "formation of."
" 136, transfer note from page 137.
" 146, lines 1, 8, 26, 30, for "centrepetal" read "centripetal."
" 146, line 32, insert a comma after "vessels," and omit the one after "firmly."
" 147, " 25, for "centrepetal" read "centripetal."
" 151, " 41, for "sympton" read "symptom."
" 154, first note, for "Myelitide" read "Myelite."
" 156, line 36, for "flood" read "blood."
" 160, lines 20 and 45, for "centrepetal" read "centripetal."
" 161, line 32, for "some" read "same."
" 162, " 16, for "Araetens" read "Aretæus."
" 168, " 20, before "had" insert "and."
" 170, " 2, insert inverted commas after "heat."
" 171, " 8, for "be-" read "between."
" 174, " 40, for "60" read "70."
" 177, " 19, for "with a" read "of that."
" 183, " 8, omit "which."
" 198, " 21, for "35" read "45."
" 203, " 18, for "neurilemna" read "neurilemma."
" 240, the last note, for "Holme's" read "Holmes's."
" 265, " 38, for "established that though" read "proved that."
" 267, " 33, for "excited" read "exerted."
" 271, " 20, for "Cotugno" read "Cotungo."
" 286, " 30, for "atropy" read "atrophy."
" 288, last line, omit "ex."
" 289, line 35, for "vomitted" read "vomited."
" 294, last line, for "has" read "have."
" 300, line 8, and p. 304, line 36, for "Dynamic" read "Neuro-Dynamic."
" 306, " 38, after "when" insert "one."
" 313, " 44, after "pointed" insert "out."
" 366, " 5, for "Reed" read "Rees."

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By JOHN CHAPMAN, M.D., M.R.C.P., M.R.C.S.,

Late Assistant-Physician to the Metropolitan Free Hospital, and late Physician to the Farringdon Dispensary.

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