

ARTICLE X.

ON IRRITATION OF THE NERVES.

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[Delivered before the Society, May 25, 1836.]

FELLOWS OF THE MASSACHUSETTS MEDICAL SOCIETY :

THE time, the place, the occasion, are full of interesting associations. Once more we have met here, to embrace old friends, to congratulate one another on the flourishing condition of our Society, and the advancement of the healing art; to cherish the memory of the worth and excellence of deceased associates; and to carry forward, as we may, the great work to which our lives are devoted,—that of soothing the sorrows, relieving the pains, healing the diseases, and otherwise ameliorating the condition of man. Inclination would induce us to call up the images of those worthies, the founders of this Society,—our fathers in medicine, the venerated instructors, counsellors and benefactors of their younger coadjutors in the medical profession. We would bestow a passing tribute of respect on the characters of those fellows of this Society,—Hart, Spooner, Thurber, Macomber, Snow,

Stevenson, Robbins, who, since our last annual meeting, have ceased from their labors, but whose works and example must continue to influence, for a long time yet to come, the practice of medicine and the character of its professors.* We might, perhaps, profitably spend the hour allotted to this discourse, on the biography of Dr. J. Hart, of South Reading, who has recently closed a long and eventful life of usefulness, and lies entombed midst the scenes of his professional achievements, lamented by a numerous circle, to many of whom in their distresses he had proved a benefactor and friend. But I am not qualified for the task. I can only bear a cheerful testimony to his ability and urbanity, as medical counsellor, in which capacity it has been my good fortune to have enjoyed a few hours of instructive intercourse with him. [Note A.] We would again call up the images of the dead—the venerated dead, whom we have seen occupying these seats, and taking the most active part in the proceedings of this association. But it cannot be. They have passed away, and we, with surprise, find ourselves in their places, and called to the performance of duties which they so well discharged, and for which we feel so ill prepared. But the cause in which we are enlisted is worthy of our best

* The following Fellows of the Society are known to the author to have died since the last annual meeting:

Dr. John Hart,	Æt. 84,	South Reading.
Wm. Spooner, M. D.	“ 76,	Boston.
Daniel Thurber, M. D.	“ 70,	Mendon.
Dr. Charles Macomber,	“ 55,	Marshfield.
Caleb H. Snow, M. D.	“ 39,	Boston.
J. Greeley Stevenson, M. D.	“ 36,	“
Chandler Robbins, M. D.	“ 35,	“

efforts, and no one should feel at liberty to withhold the contribution of his mite towards the improvement of medical science. Called upon daily to observe and study facts, which tend to elucidate the phenomena of life, health and disease, it were strange indeed if the humblest intellect here had not treasured up some ideas worthy of the attention of far more gifted minds.

Encouraged by this consideration, I without apology proceed to execute the task assigned me. If there should prove but little grain, much chaff, and even some noxious seed, in the offering, I rejoice to believe each of my audience able to sift out and save the former, and to prevent the latter from disseminating extensive mischief.

The science of medicine includes the philosophy of man. This may be divided into two branches, anatomy and psychology. By psychology I understand the doctrine of the soul, life, mind,—all those invisible vital energies, whose agency is manifested in the formation, the natural functions, and morbid action of the organs, which compose the human body. An adept in the art of healing must be conversant with the entire nature of man. In tracing the effects of morbid action, on the structure of organs, or on their functions, and in his investigations of disease, the physician should never overlook any of the powers, faculties, feelings, or emotions of his patient; or fail to inquire, what influence these may have had in originating, modifying, or continuing the malady which he is called upon to palliate or cure. Often, cases apparently the most simple will prove incurable,

unless relief be administered to a disquieted mind. Often, a simple wound cannot be healed, till the irritation of a distant organ be soothed to rest. It is difficult for the mind to grasp, at once, all the circumstances and conditions of each and every part of our complicated organization, either in health or disease.

Hence, some distinguished pathologists, looking only at a few prominent points in a case, have formed visionary hypotheses, and jumped at conclusions absurd and erroneous. So obvious is the danger of falling into this error, that others have discarded all theories, and rejected even the legitimate inferences which sound reason draws from admitted facts. Pearson, the author of the concise and good practical essay on the principles of surgery, placed by this Society in the hands of all its Fellows, rejects all metaphysical causes, enumerating among such, "constitution, living principle, and sympathy," declaring that "the existence of MORBIFIC and CURING *faculties* must be demonstrated, before any interpretations founded on their agency, can be admitted." A surgeon doubting the existence of the living principle, a curing faculty, requiring the demonstration of self-evident propositions, exhibits himself under one of the strangest hallucinations imaginable. His practical remarks contradict his theory,—for even he has his theory, at every step. A system of natural philosophy, which should reject the agency of attraction, light and electricity, would be an appropriate counterpart to that system of medical philosophy which attributes little or nothing to the influence of life, spirit, mind, and sympathy on the functions of the several

organs which constitute the human body. But while there is danger of disregarding entirely the agency of invisible powers, it should never be forgotten that the laws which govern these agencies can be investigated only by the aid of material instruments; and that in medicine, as in every other branch of philosophy, the inductive mode of reasoning can alone be relied on.

Starting, then, with these self-evident propositions, there is *spirit*, and there is matter, in the constitution of man; I propose, in this discourse, to analyze some of his diseases, to learn, if possible, what they are, and how they may be cured.

Disease is morbid action, or morbid sensation. Action and sensation are dependent on the nervous system. In proportion, therefore, to the extent and accuracy of our knowledge of the brain, spinal marrow, ganglions, and nerves,—their functions, their relation to the other tissues, and the means of regulating their tone and action, will be our success in practice. In reviewing the discoveries and improvements in medical science during the last thirty years, I think it may be safely asserted, that those which relate to the nervous system, estimated by their utility to mankind, hold a very high, if not the very first rank. And yet how little we know of its functions! How few of its innumerable phenomena we as yet understand! Sir Charles Bell has demonstrated that the same nervous filament does not, as formerly supposed, endow parts with the faculties of feeling, and motion. The nerves are now divided into those of the particular senses, motion, common sensation—and the ganglionic or nerves of organic life. But have

we as yet arrived at the simple elements of the nervous system? A moment's consideration will convince us that we have not. What is the optic nerve? Cases on record prove that the faculty of perceiving colors may be lost, while that of perceiving form remains perfect. Must it not be a compound organ, composed of filaments, which have distinct functions, one or more of which may be paralyzed, without destroying sight? The use of the cerebellum and that portion of the spinal chord which is derived from it, is as yet unknown; unless the theory of the phrenologists should prove true, in which case it may be presumed that some direct connexion between this portion of the nervous system and the genital organs, will yet be demonstrated. Numerous facts concerning sonambulism, double consciousness, and other diseased conditions of the nervous system, which have been collected, but which remain unexplained by any satisfactory theory, show how much there is yet to be learned in this branch of medical philosophy. Here is indeed a field but very partially explored, full of hidden treasures reserved to reward those who, guided by the concentrated rays of light emanating from the researches and discoveries of others, shall industriously search therefor.

I would not forget or undervalue the labors of many eminent men in pathological anatomy. There is much truth and some extravagance in the assertion of Louis, that "morbid anatomy is the only means of giving precision to diagnosis, and accurate direction to our treatment, because it is the only means of coupling symptoms with the states of the organs that oc-

caasion them." But is there no danger of mistaking effects for causes? Having discovered lesion in some organ, has he also discovered the cause of this lesion, or the means of cure? The anatomist can only examine cases which have proved fatal. The organic changes pointed out, are often a part of the ravages of death, or its immediate precursors or coadjutors. In connexion with a full view of the preceding symptoms, these discoveries enable us to better comprehend the tendencies and progress of certain symptoms to a fatal issue, and may serve to excite our efforts to remove them, but frequently add nothing to our knowledge of the means of cure.

Andral, having discovered, by post mortem examinations, cerebral congestion in fatal cases of apoplexy, after enumerating the symptoms which indicate hyperemia of the brain, among which are pain and dizziness in the head, dazzling of the eyes, ringing in the ears, momentary aberrations of vision, temporary embarrassments in speech, a sense of formication in the limbs and face, and almost all the usual symptoms of nervous irritability, which, he says, "may be prolonged for several months, nay, continue even for several years,"—candidly admits that the same symptoms usually ascribed to hyperemia, may arise from anemia of the same nervous centres; and that this is not all. "When we have referred the symptoms to hyperemia in one case, and to anemia in another," he asks, "have we come to the bottom of the matter?" and he answers, "by no means; for this hyperemia and this anemia are themselves but effects, which may be often produced by the same influence. Thus, by

a mental emotion, the skin of the face becomes red in one person, and pale in another." Anemia and hyperemia of the brain, producing the same symptoms! What means this? Can it be that a deficiency of nervous energy, in both cases, is the cause of the symptoms under consideration. In anemia, sufficient material, out of which this energy is manufactured, is wanting; in hyperemia, the machinery, by which this energy is manufactured, is impaired, and the consequence is a deficiency of the same important article in both cases.

Cutaneous diseases, during their progress, are obvious to our senses, yet these are no better understood than others which the eye hath never seen. So when dissection has discovered to us congestion in the lungs, the immediate cause of the death of the subject under examination, does it explain the cause of, or indicate the means of successfully combatting the symptoms which preceded the fatal issue? The experiments of A. P. Wilson Philip show that this condition of the lungs is produced by a division of the eighth pair of nerves. Important inferences, both in regard to the nature of the complaint, and means of cure, are obvious. It is, therefore, after all, to the laws of the nervous system,—to the invisible powers of life, which elude altogether the researches of the mere anatomist, that we must go for an explanation of the lesions and morbid appearances discovered by dissections. [Note B and C.]

We may perhaps as well here as elsewhere advert to some of the phenomena of excitability or irritability, which lies at the foundation of all action, whether

healthy or morbid, in the animal economy. Life is a circle of cause and effect, growth and decay, waste and repair, action and rest,—and health is the result of the maintenance of a due balance of power between these antagonist energies. The natural excitability of the nervous and nervo-muscular fibre must be continually exhausted by the action of stimulants, or a morbid accumulation is the consequence. Among the natural stimulants, required to produce this salutary balance, is the energy of the will, exciting voluntary motion. Hence, exercise becomes so absolutely necessary to the preservation of health. Another most powerful natural stimulus, which has been generally overlooked, or underrated as a sanatory power, is light, or the direct rays of the sun. One of the most common causes of the loss of health, and the establishment of morbid irritability in the systems of children, females, students and mechanics, is living in the shade. Like plants, growing in similar situations, a large portion of those who do not labor in the sunshine, are feeble, pale and sickly. The *solar bath*, properly used, I am persuaded would more benefit a large portion of our patients than the best selected articles of *materia medica*.* But I cannot here pursue this digression farther. What I

* It is painful to the philanthropist to witness the misery and wretchedness which a disregard to this law of our nature causes among us. To this must be attributed a large portion of the mortality of children, especially in fashionable circles. Those children who, as soon as they can creep, are allowed to follow the bent of their natural inclination,—to keep out of doors, except in most inclement seasons,—dabbling in water, rolling in the dust, and basking in the sunshine, seldom die either of fever, cholera infantum, or dysentery, notwithstanding they are more frequently than others the inhabitants of malarious domicils.

wish, is, that the tendency of irritability to accumulate, unless regularly exhausted by natural stimulants, should be borne in mind during the discussion that follows. This naturally leads to the solution of the mystery of the sudden metastases and self-limitation of the paroxysms of neuralgic and spasmodic diseases; and throws, as, I trust, will be seen in the sequel, some light on the phenomena of inflammation and fever. Here, did time permit, it would be desirable to briefly notice various other physiological facts and considerations which elucidate the views which I am about to advance. I can only allude to a few of them.

The extremities of nerves are the chief recipients of impressions, be they preservative, curative, or destructive. This fact has been established by a variety of experiments: among the most satisfactory, we may refer to those of Dr. Henry, *Edinburgh Medical and Surgical Journal*, vol. 37, p. 16. "Narcotic substances, such as *oil of tobacco*, opium, &c., applied in their most concentrated form to the brain, the spinal chord, or the larger nervous trunks, destroy the activity of those portions only to which they are applied, and their agency is never continued downwards to continuous trunks and filaments. But the same drugs, applied to the extremities of nerves, destroy the activity of the whole nervous system, and render in-irritable the muscles of both voluntary and involuntary motion." "The fibres of the heart are protected by an equally impermeable membrane, both within and without its cavities; yet a narcotic, which, when poured upon the outer membrane, is totally inefficacious, instantly suspends all irritability when it touches

the inner tunic." Why? Because, the inner tunic is made highly sensitive to the stimulus of the blood, and other stimulants, by the termination in it of numerous branches of nerves from the ganglionic system. The outer membrane is not thus supplied. Hence the difference. Hence we infer also the fallacy of one of Dr. Henry's inferences, viz., that "impressions of such poisons are received and transmitted exclusively by the nerves of sensation, which are known to propagate changes only from their extremities, upwards." If this is true of the sentient, why may it not be true also of the motor and ganglionic? The irritation of the extremities of nerves throws the whole body into convulsions. Could this be the case, did not the motor filaments convey impressions upwards? It has been demonstrated by Sir C. Bell that there is a central point in the medulla oblongata, below which all the sentient and motor nerves originate, and above which all the nervous filaments diverge into the convolutions of the brain. On the cerebral extremities, I am inclined to believe, all the impressions conveyed to the mind by four of the senses, and all emotions, sentiments and feelings generated by the mind itself, are made. On the extremities of the spinal nerves, are ordinarily received all external impressions which produce either sensation or motion.

In this place, we advert also, in passing, to what Marshall Hall calls the reflex function of the medulla oblongata and medulla spinalis,—that function, whereby action is transmitted from the part first impressed, to distant parts, supplied with nerves from the same centres. For example, irritation of the

nerves of the nose, causes sneezing; irritation of the larynx, causes coughing; irritation of the pharynx, vomiting, &c.

We must briefly notice, also, what is called the equilibrium of action. This, Burns, of Glasgow, and others, believe to be the action of the living principle diffused in an equable degree over the body, in health. Disease deranges this equilibrium. Action cannot be greatly increased in an organ, without being diminished in some other. This seems to hold true of the different systems of nerves. When the ganglionic nerves are excessively worked by an extra full diet, the intellectual, the sentient and motor systems, are rendered comparatively inactive. On the contrary, a spare or vegetable diet increases the power of the intellect, and the activity of the sentient and motor filaments. Great and long continued muscular exertion, impairs the appetite, and renders languid the sentient and intellectual system.

I have spoken, and shall speak of the ganglionic system as separate, and in some measure independent of the brain and spinal marrow. A. P. Wilson Philip instituted experiments which prove that mechanical and chemical irritation of the cerebrum and medulla spinalis, influence in some degree the action of the heart. From this fact, he inferred that the ganglions "combine and convey nervous influence from every part of these organs." But he seems to have forgotten that ganglionic nerves are coextensive with the vascular system, and that in his experiments he directly irritated their extremities. I shall not, however, undertake to settle the controverted question in

regard to this theory. Admitting that the ganglions do nothing more than combine and convey the influence of every part of the brain and its appendages, this combining and conveying so changes this influence as to fit it to preside over functions entirely different from those which are maintained by cerebral and spinal nerves, and it is altogether immaterial to the present discussion, which theory is correct.

All action, I have said, is dependent on the nerves. I am aware that A. P. W. Philip, and others, consider muscular irritability independent of nervous influence. But what is muscular fibre, separated from nervous tissue? who has seen it? whose experiments are satisfactory on this subject?

As at present informed, the term *nervo-muscular*, as used by Marshall Hall, agrees best with my ideas of what is otherwise called the muscular tissue,—the extremities, perhaps, of the nerves of motion, modified and fitted for the function required. When chemically analyzed, nerve and muscle are found composed of the same elements, differing a very little in the proportion which they bear to each other. And is it absurd to suppose, that living albumen may become living fibrin, and retain all the excitability of its original structure?

In the same manner, the extremities of the ganglionic nerves may be supposed to form or amalgamate with the contractile coats of the arteries, capillaries, veins, &c., endowing these parts with the irritability necessary to the function required of each.

When this theory is viewed in connexion with the numerous physiological facts, which prove action in

every tissue, and in every part, produced, modified, suspended, or destroyed, by causes which act and can act only on and through the nervous system, I feel constrained to adhere to the position just stated,—that *all action, and, of course, all disease, is dependent on that system.*

The investigations, experiments, and facts collected, stated, and commented upon, by those medical authors who have recently written most largely on spinal irritation, hysteria, and other nervous disorders, have thrown much light on the phenomena of disease in general, and will, I believe, when followed out to their legitimate results, lead to successful practice in many complaints which have hitherto been deemed incurable.

To avoid circumlocution, the result of these inquiries is so far anticipated, as to state that diseases may be naturally divided into four classes. [Note D.]

1. Neuralgic, affecting principally the nerves of sensation.
2. Spasmodic, affecting principally the nerves of motion.
3. Inflammatory, febrile, and organic, affecting primarily the ganglionic nerves.
4. Mental, affecting the moral and intellectual portions of the nervous system.

CLASS I.

Diseases of the first class, in their most simple form, consist in disordered sensation. Those upon which I shall offer a few remarks, are characterized by painful sensation, without tumefaction, or organic lesion.

We meet, in practice, a patient who complains of paroxysms of pain in the face, or some other part of the body. It may be excruciating, subjecting the sufferer to the severest tortures for minutes or hours, and then cease, perhaps entirely, leaving only a tenderness, or increased susceptibility to external impressions, to pressure, cold air, or motion of the muscles, either of which may be sufficient to renew the paroxysm with all its violence, at any moment; or, at longer intervals, the paroxysms may return without any assignable cause. In other cases, the severity of the pain may vary, from the most severe, down through all the grades and varieties of morbid sensation, to a trifling uneasiness, continuing most of the time; or to slight twinges of acuter pain which are momentary, and few and far between. In these cases, generally, there will be found, on examination, tenderness at the origin, in the spinal chord, of the nerves which endow with sensation the parts involved in the disease. Frequently, pressure on this portion of the spine will cause, in greater or less degree, the renewal of the paroxysm. This tenderness may also be discovered by passing over the spine a sponge dipped in hot water. If we analyze the complaint under consideration, we shall find it to be pain, and nothing else. Pain, I conceive, always arises either from an increased irritability of the nerves of sensation, whereby mild stimulants, which, in a healthy state of these nerves, produce only pleasurable excitement, become irritants, sufficient to bring on, in some instances, the most intolerable anguish; or, from powerful stimulants, acting on sound nerves. The effect of stimulants, it

seems, on the irritability of the nerves, depends much on the extent and mode of application. The same stimulant, suddenly and largely applied, exhausts the irritability which, by a slow and sparing application, increases it.

Numerous facts support this position. Opium, and other drugs, prove either "stimulant or sedative, according to the degree in which they are applied. The stimulant effect always arising from the less, the sedative from the greater, application of them." It is to the reflex function of the nervous centres that we must look for an explanation of this phenomenon. Moderate irritants cannot be long applied without producing the morbid condition of the nerves under consideration; and hence I infer that long continued pain, in all cases, is essentially *neuralgic*, and consists in the increased irritability of the sentient filaments alone, in whatever combination of morbid symptoms it may be found. This, if I mistake not, is *a most important truth*, never to be lost sight of in our investigation of disease. There may be a vast deal of suffering from simple neuralgia, without material injury to the general health; that is, the vital functions may all go on regularly, and with nearly their natural vigor, notwithstanding neuralgic distress may be a constant attendant for years. For the sentient nerves preside over no function, essential to the continuance of life, or sound organization; and consequently no organic lesion occurs in consequence of any morbid action, which is confined to this portion of the nervous system. So intimate, however, is the connexion between the sentient, motor and ganglionic nerves, that

intense and protracted neuralgia usually induce secondary symptoms, i. e., involves in the disease other functions than the one first affected. The fact that spinal irritation exists in a very large proportion of chronic complaints, organic and functional,—complaints, which differ very essentially from each other in their other symptoms, progress and termination, have caused many eminent physicians among us to be altogether sceptical in regard to the modern doctrine on this subject. But if, as I have stated, all pain be essentially neuralgic,—that, so far as this symptom alone is concerned, the pain of cancer of the face is identical with that of tic douloureux,—this difficulty vanishes. The difference of the two diseases consists in other particulars, the latter being simply morbid action confined to the sentient nerves, the former involving the ganglionic, destroying, or changing to a most unhealthy condition, the functions of secretion and nutrition. We may, therefore, expect to find a similar tenderness at the origin of the painful nerves, in both cases ; and, consequently, the means of cure in the one case may afford the greatest relief in the other. Much has been written on the subject of mimoses,—functional complaints, which imitate very closely organic diseases, in many of their symptoms, that is, as I understand it, just so far as organic diseases produce or are complicated with the same morbid condition of the sentient nerves, as in other cases exists alone. Some, also, object to the correctness of the doctrine of spinal irritation, because the local remedies, usually recommended, and which often prove efficacious, as often fail to cure, even where tenderness at

the origin of the diseased nerves is most decidedly manifested. But let it be remembered, spinal tenderness and neuralgic disease are often caused by irritating impressions on the extremities of distant nerves, which continue to act, while we are attempting to counteract them: we are endeavoring to exhaust a stream, which is constantly refilled from an unfailing fountain. I would say, with Mr. Brodie, "You must, in each individual case that comes before you, study the disease pathologically." I would add, study your patient also anatomically and psychologically,—search with the eyes of a medical philosopher,—the body and the soul, the thoughts and the habits, the passions and the temperament, or you may fail to find the primary irritation, on the removal of which, success depends. It is also sometimes said, that irritation or tenderness of the spinal chord, if it did exist, could not be discovered by pressure, because the vertebræ are so fixed that pressure on them could not possibly compress the chord. Hence, it is inferred, there must be some fallacy in the experiment; but the doctrine is not that the spinal chord is compressed, but that the portion which is diseased, conveys to the nerves proceeding from it, its own sensitiveness, and the covering of the vertebræ being supplied with nerves therefrom, these nerves, the shortest conductors of impressions to their centres, by their own condition, indicate that of their origin. That spinal irritation has been too generally understood to be a local complaint, even by some able writers on the subject, we need not take time to prove. In Johnson's review of Dr. and Mr. Griffin's "Observations on the func-

tional affections of the spinal chord," &c., after commending this work, it is said, "they may have seen, or rather fancied spinal irritation where it did not exist, or where it only formed a part of general nervous irritability, especially in females." Now I believe that spinal irritation cannot long exist without affecting, or at least becoming connected with the affection of the nervous system, so extensively as to become a constitutional disease; and that, vice versa, general nervous irritability will most commonly be manifested by tenderness about the great nervous centres; and that it very frequently arises from causes which operate on the extremities of nerves distributed over a large portion of the body.

The Griffins state, what every physician in much practice may confirm, that, "if a nervous or hysterical woman hears unfortunate news, if the catamenial flow is interrupted, if the uterine action, in advanced pregnancy, becomes too powerful for the system, we believe there is no part so readily affected as the centre of the dorsal spine;" that out of sixty-nine cases of affection of the cervical and dorsal portion, there was pain in the stomach in fifty-seven. In view of these facts alone, who could call tenderness about the eighth dorsal vertebræ a local complaint? As well might we call those fevers local which produce the greatest lesion in some one important organ. The very fact that nervous irritation becomes manifested in the great nervous centres, would seem to be sufficient to prove its claim to be considered a constitutional disease. When "the head is sick, the whole heart is faint," and the nervous centres are parts too important in

the animal economy, to suffer alone. It is said, also, that tenderness of the spine is not always attended by neuralgic complaints. This proves nothing more than that the integuments covering the spine, like every other portion of the body, from external injury and a variety of other causes, may become slightly diseased, and this may long continue limited to the spot first affected. The careful examiner can find but little difficulty in distinguishing these cases from those which are connected with neuralgia and other functional disturbances, in parts furnished with nerves from the irritated centre. In neuralgic diseases, it is important to distinguish between those of centric and those of eccentric origin. That is, whether the disease which manifests itself in the extremities of the nerves, at the present time, is to be referred to irritability of the nervous centre, or to the continued operation of irritants upon the extremities of other nerves. For example, neuralgia of the face may be centric, originating in the irritation of the cervical portion of the spinal chord; or eccentric, arising from acting irritants, such as a decayed tooth, a spicula of bone within the cranium, acrid matter in the intestines or elsewhere; and the treatment must vary accordingly.

CLASS II.

We pass to notice briefly, diseases of the second class, such as affect the nerves of motion, chiefly, or alone; such are simple convulsions, or spasms, without pain, chorea, epilepsy, &c. That these complaints consist in diseased action of the motor fila-

ments, is too obvious to need argument ; and that such violent convulsions can exist without pain, is collateral proof of the correctness of Sir C. Bell's anatomical demonstrations. That this diseased action arises from the increased excitability of these nerves, and is strictly analogous to the increased sensibility of the sentient nerves, seems equally clear to my comprehension. In these diseases, more strikingly than in those of the first class, the excitability becomes exhausted by the violent action set up by the disease itself, and the paroxysm ceases in a longer or shorter time, spontaneously. The irritation of both the motor and sentient filaments composing the same nerve, produces painful spasm or cramp. Diseases of this class are combined, in a great variety of ways, with those affecting other portions of the nervous system. I pass to the consideration of diseases of

CLASS III,

Inflammatory, febrile, and organic. These, it is believed, consist chiefly in the disordered excitability of ganglionic nerves. It is, however, in their mildest form alone, that they can be considered simple affections of these nerves. In all severe cases, the sentient filaments suffer with them. The organs of circulation, secretion, and nutrition, are supplied with nerves from the ganglions. These functions are impaired or destroyed by the class of diseases under consideration. I will endeavor to analyze inflammation. Of this disease, there are, according to Pearson, two essential characters: "1. An augmented velocity and strength of contraction of the arteries. 2. Painful

sensibility of the nerves." "Where these are present," says our author, "inflammation is present; where any one of these characters is wanting, the disease is not inflammation. Heat, redness and tumor, although attended with more frequent contractions of the blood-vessels than are natural, by no means characterize a disease to be truly inflammatory." Augmented velocity and strength of contraction of the arteries.—This must arise, either from increased excitability of the nerves that preside over this function, or from increased stimulus in the blood which circulates through the inflamed part; and this being a portion of the same mass which produces no disturbance elsewhere, the last supposition is inadmissible. "Painful sensibility of the nerves."—This is neuralgia, the same affection of the sentient nerves that constitutes diseases of the first class. This may arise secondarily from the distention of the parts, increased heat, &c., or the cause of inflammation may act directly on the sentient and ganglionic nerves at the same time. [Note E.] The progress and effects of inflammation, also, shed some light on the pathology of the disease. "Inflammation," says the author above quoted, "is never stationary, but when once it is properly formed, is either in progression towards a natural cure, or the destruction of the part, or it proceeds to a termination in some other disease. Its usual termination is either by resolution, suppuration, gangrene, or induration." Here, then, we discover the operation of the same law that governs the irritability of the sentient and motor nerves, viz., it becomes gradually exhausted by the action of the disease it-

self. It is this law that regulates the paroxysms, and limits what are called self-limited diseases. The termination depends chiefly on the degree of excitability which the ganglionic nerves acquire during the progress of the disease. These nerves, I have said, preside over the function of nutrition, consequently, no dilaceration can take place, unless the excitability of some of the extremities of these nerves be exhausted. And this, perhaps, can only be exhausted by excessive action. Hence, if the violence of this action can be kept by appropriate remedies, within bounds consistent with the continuance of life, in every filament, inflammation terminates by resolution. Hence, the most powerful stimulants become deadly sedatives. Hence, a more violent degree of inflammation, terminates either by suppuration or gangrene. And the only difference between these modes of termination, depends on the extent of the parts involved in the total loss of vitality. When this is confined to a small portion of the cellular membrane, abscess is formed. How? What is pus? The function of nutrition is interrupted by inflammation. By this function, the nutrient element is separated from the arterial or capillary blood, and applied to the living solid which needs repair, to which it adheres by a vital affinity, and becomes a part of the same.

As soon as the irritation of the nerves concerned, is so far reduced as to allow them to resume their natural office, an effort is made to repair the damages sustained by the recently inflamed part. The nutrient principle is separated from the blood: is con-

veyed to the place where it is needed ; but it there meets with dead instead of living matter. For the former it has no affinity, it cannot go back ; it is poured out between the dead and living in the form of pus. "Pus," says Pearson, "is always formed when the condition of the parts is below inflammation, when the action of the vessels differs very little from that which is healthy." Granulations are always formed in purulent matter. These, and many other facts, support the theory now advanced. The termination of inflammation by gangrene, exhibits exactly the same kind of phenomena, differing only, as I said before, in the extent of parts destroyed by the disease.*

Inflammation of the serous membrane, if it does not terminate by resolution, so far injures the minute vascular machinery by which exhalation and absorption is carried on, as to unfit it for its natural function, and the consequence is, as the diseased action subsides, the nutrient element designed to repair the injury, is poured out, diluted by the exhaled serum, forming those copious effusions which so often terminate suddenly the life of the sufferer.

Inflammation of the mucous membrane, if not so severe as to produce sphacelus, or ulceration, may so change and increase the natural secretion, as to form the artificial membrane, which proves so fatal in

* Among the organs which may be restored by granulation, and even extended far beyond their natural limits, are the ganglionic and sentient nerves themselves. These are abundant in fungus growths and tumors. When, by disease, parts not usually endowed with sensibility, become painful, as is sometimes the case, even with the hair, must it not arise from their becoming fungoid, and the extension into them of these nerves ?

croup, &c. In all these cases, precisely the same kind of nervous irritation, manifested by increased vascular action, and painful sensibility, characterizes the diseases. Strong, if not conclusive arguments for the correctness of this theory may also be drawn from the most successful means of relieving or curing inflammation. These either diminish the stimulus applied to the nerves, or lessen the sensibility of the nerves to the effect of stimulants applied.

Another proof of our doctrine may be derived from the fact that inflammation is sympathetically set up in parts having no connexion with those primarily inflamed, except by the nerves through their ganglionic or spinal centres. And that inflammation and abscess may be caused by "violent perturbation of the mind," we have the testimony of Pearson, the sceptical author, above quoted. That inflammation sometimes spreads laterally to parts lying in contact, although there be but a very remote connexion either by nerves or blood-vessels, forms no objection to the views above stated. The morbid heat and acrid secretions of the inflamed part, become direct irritants to adjacent parts. Hence, inflammation of the pleura inflames that portion of the lungs which lies in contact with it.

I must hasten to the consideration of fever. In this, the ganglionic nerves seem to be primarily, and the spinal nerves, both sentient and motor, secondarily affected. The elements of the disease are essentially the same as those of inflammation, more extensively diffused, and affecting, in a greater or less degree, every function of the whole body. Here we find a combination of symptoms, indicating morbid irritabil-

ity in each of the nervous systems. The extensive lesions which occur in fatal cases, and the abscesses which sometimes form in those that terminate favorably, seem to identify the kind of morbid action which constitutes both fever and inflammation. The cause of fever, or that to which the chief agency in producing it is now generally ascribed, viz., malaria, indicates its character. Malaria, the pestilence that walks in darkness, seems to act as other powerful stimulants might act, could they be as extensively applied to the extremities of the same nerves; more or less concentrated, it exhausts or increases irritability accordingly.

Malaria, in some instances, destroys life at once, prostrates the excitability so effectually, that from the cold stage, the state of collapse, there is no recovery. More diluted, it depresses this vital power, for a time, but it again accumulates, reaction takes place, and the usual succession of changes which constitute a well-marked paroxysm of fever follow. The common remark, that a fever which runs high will be of short duration, is founded in truth, and is explained by the law regulating irritability, above stated. But if the subject of fever remain in the malarious atmosphere in which he contracted the disease, the continually renewed irritation may render the paroxysms irregular, and protract the complaint beyond its ordinary limits. Hence is inferred the importance of removing patients, where this is practicable, to a more salubrious location, on the commencement of fever. [Note F.]

I pass to the consideration of rheumatism. This belongs rather to the first class of diseases, but, to

save repetition, I have chosen to speak of it here. With this disease, I have been made personally and very intimately acquainted; to it, I am indebted for what I now esteem a very valuable part of my medical education, and, although I have no desire to repeat again the same lessons, or longer to inhabit the same house, with so harsh a preceptor, I look back upon it with that kind of veneration which the man oft entertains for the stern old *school-master* whom the boy feared and hated.

Here, irritation of the sentient nerves,—spinal irritation, neuralgia,—is the leading symptom. The nerves of motion are often but slightly diseased; the difficulty of motion arises from the dread of pain, rather than from inability to move. There occurs, however, one symptom, not generally mentioned in books, which proves not only that the motor filaments partake, in some degree, of the irritability of the sentient nerves, proceeding from the same centres, but also that the muscles are not the seat of the painful sensations which characterize this complaint. This symptom is a slight involuntary twitching of the muscles, without pain, occurring at intervals, not so constant as *subsultus*, and very different from the peculiar spasms of malignant cholera.

In acute rheumatism, the ganglionic system of nerves suffer considerably, although irritation in them seldom becomes sufficiently severe to produce lesion. This disease, so far as it affects the ganglionic system, is self-limited, like fevers and inflammation; but the affection of the spinal nerves continues an indefinite length of time. Seated in the medulla spi-

nalis, it seizes on one set of nerves to-day, partially exhausts their irritability, and proceeds to another to-morrow, until perhaps it has again and again affected in succession every part of the sentient system. This, however, is not generally the case. Some portion of the body or some of the important organs are often spared, while the other parts are incessantly harassed by its tortures. Rheumatism has been supposed by some to affect only certain membranes. This I doubt; wherever there are extremities of sentient nerves, there neuralgia and there rheumatism may and does manifest itself. The skin becomes highly irritable. This is evident from the effect of cold or hot air or water. Chills, from the changing temperature of the air in contact with the body, creeping over the back and elsewhere, is often a well-marked symptom. Formication also frequently attends on this complaint. Further to identify rheumatism with nervous irritation, much of the suffering arises from precisely the same sensations as follows pressure on large nerves, when, in common parlance, it is said the limb is or has been asleep; when, in the language of an eminent professor of rhetoric, "torpor tingle in the veins." Every one, who has felt this sensitive numbness, by supposing it continued an indefinite length of time, may form a better idea of the torture from rheumatism, than language can convey to those who never felt it.

In this manner, I might go over the whole catalogue of diseases, and show that the irritability of some portion of the nervous system increased or diminished, is, if not the whole, an element of each,—an element

of sufficient importance to require attention in the treatment of every case which occurs in the practice of physic. I have spoken of irritability and irritation, as if this condition of the nerves were always one and the same thing. This may not be the case. There may be specific differences in the condition of the nerves, as well as in the agents that irritate them. The fact, that certain poisons are incapable of producing the same disease more than once in the same individual, favors this supposition. But, after all, the different symptoms and appearances discoverable by our senses, may be nothing more than the changes of which a few simple elements are capable. Like the few material elements in chemical compositions,—like the few colored beads and granules in the kaleidoscope, may be the few elements of morbid action in the constitution of man, which, by their permutations and combinations, produce all the variety of disease. Be this as it may, in civilized society, and the more so, the more society is civilized and refined, it is morbid irritability, in some form or other, that the physician has every where to combat in his daily practice.

I pass to the treatment of diseases,—to consider some of the means of managing, regulating or removing the morbid irritability under consideration. Here, as in pathology, a few leading principles, kept constantly in view, may prove useful guides in practice ; the

1st, Indication, is to remove, if possible, the original irritating cause ;

2d, To protect the tender diseased nerves, against all other irritating impressions ;

3d, To excite a strong counter action or sensation in some portion of the nervous system, which is not principally diseased ; and

4th, To diminish the irritability of the diseased parts, by the direct application of sedative medicines.

More than one of these indications is often fulfilled by the same remedy, and several remedies may as often be resorted to, to fulfil a particular indication. My remarks on remedies must be brief and desultory, and confined to such as, in my opinion, have not been, as much as they deserve, known and appreciated. When, therefore, I speak of a certain medicine or operation, affording relief or effecting a cure, I would not be understood to say, that to do this, or exhibit that, is all that good practice requires in any one case ; or that these applications are to be generally relied on, to the exclusion of others which have the testimony of the highest authorities, for ages, in their favor.

To fulfil the second indication in painful diseases, is often a most important part of the treatment. To allow the irritability of the nerves to subside, rest, in an easy position, is indispensable. For this purpose, no invention within my knowledge, equals in importance, Arnott's hydrostatic bed ; notwithstanding the difficulty often met with, of persuading patients to use it. Because it feels so unlike any thing before used, and because it does not always immediately relieve the pain, many will not give it a fair trial. But, where a patient will persevere until he gets accustomed to its motion and peculiar softness, I have never known an instance of its failure to contribute

to the comfort of a sufferer from neuralgic complaints. I have one most sensitive patient, who has been on a hydrostatic bed more than two years, and who could not now be induced, on any account, to exchange it for another, who, for the first few days, disliked it exceedingly, and, for more than two weeks was occasionally lifted to a feather bed, for relief! My remarks apply only to Arnott's bed, and not to the bag of water which has in some places been substituted for it.

Inflammation may be cured in its forming stage, by diminishing the quantity of blood which proves too stimulating to the irritated ganglionic nerves [Note G]; or it may be successfully treated by nauseating drugs, by cathartics, by cupping, blistering over the origin of the spinal nerves which supply the inflamed part; or it may be arrested at once, by opium, and other narcotics. The most successful method of treating croup, with which I am acquainted, is to administer an emetic of tobacco, antimony, or sub. sulph. hydrarg., to break up and remove the forming membrane, and then to allay the irritation by opium, boldly exhibited; that is, by giving as large a dose as we feel confident the patient will bear, and repeating it at least every hour, until the desired effect, sleepiness and relief, be obtained.

In the first stage of pleuritis, opium, given as above mentioned, has the happiest effect; it subdues at once the morbid irritability, and as soon as the patient is freed from the operation of the medicine, he may be considered convalescent. I wish here, to be distinctly understood, it is only in the forming stage, when the

pleuritic pain has continued but a few hours only, that I would recommend opium ; for no farther does my experience insure success. When inflammation has made certain progress, i. e., when much tumefaction has taken place, when the fluids usually retained in their proper vessels, have either escaped into the cellular membrane, or become, to a certain degree, stagnant in the capillaries, especially when there is evidence that any considerable lesion has taken place, the free use of opium, I have supposed contra-indicated.

Another important resource in the treatment of inflammatory, febrile and neuralgic diseases, is counter-irritation, near the origin of the spinal nerves, which partake most of the diseased action. This may be effected by cupping, blistering, pustulating with tartarized antimony, leeching, or by the application of rubefacients over the spine. [Note H.] In plethoric habits, and in the presence of inflammatory diathesis, scarifying and drawing blood with the cupping-glass, is perhaps the preferable mode of using it ; but dry cupping will answer every purpose for which it is usually prescribed. How shall I impress on the minds of this audience the full value of this simple remedy ? Cupping, alone, I am confident, skilfully applied, will relieve one third of the medicable pain we meet in our practice. The use I make of this remedy, which in most cases answers all the purposes of counter irritation, without the soreness which follows blistering and pustulation, shall be stated as briefly as possible. No formidable or expensive apparatus is required : a common half-pint tumbler and

a piece of waste paper, is what I most generally use. A patient complains of cold chills, followed by headache, dull pains in the back, limbs, a hot, dry skin, thirst, and a full, frequent pulse.

The paper is set on fire, and dropped, in full blaze, into the tumbler, which is immediately inverted on the back of the neck. If the patient be not too sensitive, another glass may be placed in the same manner, a few inches below the first. Let them remain ten or fifteen minutes, or until the portion within the glass becomes tumified and injected with purple blood. If, by this time, the relief is not obtained, remove them successively to other portions of the epispinal region. This process I have sometimes continued one hour and a half, but generally less time will be sufficient to relieve the pain, reduce the hardness and frequency of the pulse, and often break up the forming disease. Other cases, following up the advantages gained, by the remedies usually prescribed, may be rendered comparatively mild and manageable. In all sudden attacks of lumbago, and other rheumatic affections, similar benefits may be at once obtained by cupping. Coughs, asthma, and angina pectoris may be temporarily, and sometimes permanently relieved by the same means. Cramps in the limbs or stomach, and particularly such as are often so troublesome in the latter months of pregnancy, and during parturition, will yield readily to this treatment. The true pains of parturition even may be much mitigated, and the preliminary and subsequent pains arising from uterine irritation, may often be rendered comparatively trifling by cupping over

the lumbar and sacral portions of the spine. [Note I.] In short, there is no pain, wherever situated, that may not be relieved, temporarily, at least, by cupping on some portion of the back, unless the subject be so excessively irritable as to be unable to bear strong impressions of any kind, without an increase of suffering. When the pain arises from organic disease, or when the irritating cause has not been, or cannot be removed, cupping, like other means of mitigating suffering, must fail to cure. And where other salutary means of relief are within reach, cupping should not be depended on alone. But, in treating all febrile and painful diseases, the physician should never forget that cupping, added to other means used—for it interferes with none, or very few—may often possess sufficient power to turn the scale, in favor of life or health, when, if it be omitted, death or continued suffering would be the consequence. [Note K.]

Strong impressions on the mind, in cases of nervous irritability,—and what cases of disease are not more or less such?—often perform almost miraculous cures. To confirm this position, I need only to refer to the occasional success of the various kinds of quackery, and humbug, so prevalent in the world, and to the efficacy of many of the most correct and philosophical prescriptions, which can only act on the disease through the agency of mental excitation. To qualify himself to operate, if need be, on the mind of his patients, is a part of every physician's professional duty,—a duty by far too much neglected by the regular faculty.

And, lastly, morbid irritability may be excited or controlled by strong impressions on the extremities of the nerves of the alimentary canal, and throughout the whole vascular system, by agents administered internally. Having but little that is new to say on this unlimited subject, I pass it with a few cautionary remarks only. The apothecary's shop and nature's garden, the much vaunted store of botanic medicine, furnish not only salutiferous physic, but deadly drugs also; and much, very much, of the morbid irritability which we meet in practice, originated in those prolific sources of good and evil. Our medical literature is not free from pernicious prescriptions; our newspapers, almanacks, and receipt-books are full of certain cures, which, if correctly interpreted, would mean certain producers of disease; and every man, woman and child feels qualified to prescribe at least some vegetable poison, for the cure of his own complaints, or those of his neighbors. While condemning, in the most unqualified terms, the use of minerals in medicine, pretenders to medical science are too ignorant to know, or too base to acknowledge, that the most deadly drugs with which we are acquainted, are of vegetable origin;—that such even was

“ the fruit

Of that forbidden tree, whose mortal taste
Brought death into the world, and all our wo.”

The *medical philanthropist*, while he looks with astonishment on the reckless eagerness with which the multitude swallow falsehood, and deleterious drugs, selects with care, and applies with caution, his remedies from the *materia medica*. He estimates

the danger from the disease, and the danger from medicines, "looks before and after," and weighs, against the value of present relief, the consequences of particular modes of medication, and acts according to the laws of honesty and the dictates of an enlightened judgment, regardless of a rival's sneer, or a quack's malediction. Such, alone, are worthy of fellowship here,—such, alone, can make themselves deservedly loved and honored through life, and give significance to the star which must probably, ere long, be affixed to their names in the catalogue of Fellows of the MASSACHUSETTS MEDICAL SOCIETY.