An inaugural essay on zoo-adynamia ... / by Geo. J. Ziegler.

AN

INAUGURAL ESSAY

ON

ZOO-ADYNAMIA,

PRESENTED FOR THE DEGREE OF DOCTOR OF MEDICINE IN THE UNIVERSITY OF PENNSYLVANIA.

BY

GEO. J. ZIEGLER, M. D.

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PREFACE.

In presenting this essay to the profession, the writer is influenced by various considerations, the most important of which is the desire to be useful. He hopes to excite upon the subjects discussed more direct attention and deeper reflection than they have hitherto received, more with a view to the establishment of correct pathological principles and treatment than a desire for hypothetical or theoretical speculation. He has endeavored to arrange and classify a great number of morbid conditions, and to exhibit the fact, which appears to be very much overlooked, that there are many diseases induced by or dependent upon different pathological conditions, and thus do away with the prevalent idea of the existence of specifics for such diseases, as, for instance, epilepsy, chorea, &c.

In examining this essay, the reader will find that frequently the same disease is placed in two or more and sometimes all of the divisions therein made, as being dependent upon different pathological changes, and hence require a diversified and varied, and, in many cases, totally opposite course of treatment.

The subject affords an opportunity to the writer to call attention to a much-neglected remedial agent, which has not received that favorable consideration in the treatment of disease to which he believes it to be entitled, viz., *Nitrous Oxide Gas;* and he has pointed out some of the deranged states of the organism to which it appears to be well adapted, and in which he believes it will be found highly useful.

In consequence of the necessarily limited extent of an inaugural essay, the writer can merely point out examples of the conditions to which he refers, leaving further illustrations to be supplied by the suggestions of the mind of the reader.

It is not pretended that all the suggestions or opinions which are advanced in the following pages are supported by the test of experience, opportunity not having yet been afforded to substantiate them; still it

is believed that the more closely the views are examined and made the subject of practical inquiry, the more manifest will be their correctness.

The writer has been induced to attempt an arrangement and classification of the abnormal conditions which are presented, from the confusion and obscurity in which they are found in most authors; and, if this attempt is at all successful, the main objects of this essay will be attained, believing that, as much error has prevailed in reference to the pathology of the diseased actions in question, much benefit must accrue from a removal of such error, and thus a more correct knowledge will be afforded of the method of subverting them.

PHILADELPHIA.

INTRODUCTION.

In selecting this extensive, interesting, and highly important subject, viz., Zoo-adynamia, for an essay, I have done so, not so much with the expectation of suggesting or adding anything new as for the purpose of drawing the attention of the profession more particularly to its importance, and thus induce them to undertake a full and complete exposition of it, so far as a knowledge of physiology, pathology, and therapeutics will admit; and, in this manner, not directly, but indirectly, I hope that my humble effort may result beneficially to "suffering humanity."

REASONS FOR MODIFYING THE TERM "ADYNAMIA."

This term, "adynamia," is employed to designate the deficiency or privation of vital or animal power; but, if the etymology of it is examined, it will be found to be too general in its application, and may be understood as being applied to the deficiency or privation of either mechanical, physical, chemical, or vital power. In adding a prefix, therefore, I do so from the conviction of the inadequacy of the word alone to express the idea really desired and intended in its employment in medicine; and, to make it more specific in its signification, I would, therefore, suggest the prefix zoo from zoon, thus making it zoo-adynamia, signifying privation or deficiency of animal or living power.

ZOO-ADYNAMIA.

Zoo-ADYNAMIA, a ζωον, anima or life, α, privation; and δυναμις, force or power.

Zoo-adynamia may be divided into psychico-adynamia, and neuro-adynamia; the first from ψυχη, soul or mind, α, and δυναμις, thus meaning a deficiency or privation of mental power; the second, from νευρον, nerve, α, and δυναμις, deficiency or privation of nerve power.

Psychico-adynamia and neuro-adynamia may be local or general, partial or complete, temporary or permanent in their character, and may result from, 1st. Modification of structure; 2d. Interference with function without modification of structure; 3d. Inanition; and, 4th. Sympathy. All of these may be very sudden or very gradual in their occurrence.

1ST. PSYCHICO-ADYNAMIA.

As this division for a proper elucidation will require more time, space, and knowledge than I possess, I will pass it, and confine my attention more particularly to that division which I have denominated neuro-adynamia, in which there is more or less connection with the first division; for there may be derangement of the mind acting upon and deranging the nervous system, or the mind may become implicated with or be acted upon by the nervous system.

2D. NEURO-ADYNAMIA.

This may be subdivided into sensory and motor adynamia; the first, still further, into general sensory-adynamia and special sensory-adynamia; the second, into voluntary motor-adynamia, and involuntary motor-adynamia, thus—

NEURO-ADYNAMIA.

A. *Sensory-adynamia.*
B. *Motor-adynamia.*

A. SENSORY-ADYNAMIA

a. *General Sensory-adynamia.*
b. *Special Sensory-adynamia.*

B. MOTOR-ADYNAMIA.

a. *Voluntary Motor-adynamia.*
b. *Involuntary Motor-adynamia.*

For greater conciseness and convenience of description, and to prevent too much repetition, and also on account of the comparatively unfrequent occurrence of one of these forms of adynamia, uncomplicated with any other, I will place these divisions in the two groups of general and local neuro-adynamia, in which the different sensory and motor derangements will be readily recognized; comprising under the first head both sensory and motor-adynamia of the whole system, whilst under the second will be included the various forms of local sensory and motor-adynamia.

GENERAL NEURO-ADYNAMIA.

With general neuro-adynamia, we have often complications of local neuro-adynamia, some forms of which most generally precede the general attack, unless it should be very sudden, when all the nervous functions fail simultaneously; and, if the general attack does not prove fatal, it will be very apt to terminate in some variety of local adynamia. Thus, frequently the sequela of general neuro-adynamia, when not fatal, is local neuro-adynamia, except in those cases of simple syncope, &c., where the prostration is very temporary, and does not materially affect either the functions of the brain or spinal marrow, unless to debilitate them, and in this way produce a more perfect state of general inanition.

1. MODIFICATION OF STRUCTURE.

This may consist of, first, actual change of structure, as softening or hardening; second, increased or deficient development, or diminution of nervous matter by wasting or absorption after development, as in hypertrophy, atrophy, &c.; and, third, solution of continuity from mechanical causes. Softening as the result of inflammation is of very common occurrence, and is often seen in the inflammations of the different parts of the brain and spinal marrow and their membranes, denominated according to the part affected. There is also a species of softening or ramollissement not dependent at all upon inflammation, viz., that in which there is a deficiency of nutritive materials, or in which the materials for the support and development of the nervous tissue are appro-

priated to supply an excessive secretion or drain. The effects of the first may sometimes be found in the brain and spinal marrow; the second is frequently the result of masturbation or excessive venery, and may also be found in the spinal cord, &c. This latter would tend to indicate a similarity between the particles of the spermatic secretion and neurine, or that the constant impressions transmitted to spinal centres cause an inflammation or inanition of the centres impressed, which terminates in softening.

Induration is also the frequent result of inflammation from the excessive deposit of plasma or coagulable lymph, which is sometimes effused, and by which the inflammatory action is frequently arrested. It may also be caused by an interstitial deposit of tuberculous or other morbid matter, or from hypertrophy, giving rise to various derangements, such as epilepsy, chorea, convulsions, &c. It is also the result of the consolidation of old age.

Atrophy may be congenital, or the development of the brain and spinal marrow may be impeded or arrested after birth, or there may be diminution of nervous substance from absorption or consumption; as in pressure from tumors, hydrocephalus, excessive mental and physical labor, &c.—the latter frequently producing the incurable forms of epilepsy and other convulsive diseases, either from atrophy or some modification of nervous tissue.

Hypertrophy is the result of increased development from increased nutrition, induration or greater consistence being the consequence.

Solution of continuity of nervous substance may be produced by effusions of fluids, as blood, serum, &c., as seen in apoplexy, dropsies (active and passive), &c.; by blows and injuries of various kinds, either by a crushing operation, such as is exhibited in compression of the brain and spinal cord, or by a more direct separation of nervous matter from a sabre cut or similar instrument or means.

Treatment of Modification of Structure.—This will depend upon the cause, extent, and position of organic change, and the effects or symptoms resulting from the same, with the length of time of continuation of these symptoms. But it must be admitted that there is not much probability, even in the most favorable cases, except where a limited quantity of cerebral matter is removed or discharged, of effecting a permanent cure; death, preceded by convulsions and coma, generally resulting sooner or later; and in many cases it is immediate—as in apoplexy, compression of the brain, &c.—or the patient may remain in an adynamic condition for a long period, and ultimately die of some other disease.

The treatment of softening will mainly consist in supporting the vital powers; but before this change takes place it may be prevented in many cases; as, for instance, in inflammation by antiphlogistics; in deficiency of nutrition by increasing nutritive materials; and from excessive drainage of spermatic secretion, &c., by arresting and preventing that drain, this being obviously dependent in a great measure upon the will of the patient.

In those cases of induration from effusions or hypertrophy, exciting absorbents by means of depletion, mercury, iodine, low diet, &c., may cause a removal of the deposited matter, and thus relieve or cure the condition dependent upon that deposit.

That from interstitial deposit of tuberculous and other morbid matter will probably be most benefited by alteratives and tonics, such as cod-liver oil, preparations of iodine, iron, &c., and most of the mineral and vegetable tonics, nutritious diet, fresh air—in fact, strict and prolonged attention to the hygienic laws.

In congenital atrophy, it is obvious that not much can be done, although by increasing the vital powers the deficiency may possibly be ultimately supplied to a certain extent. In that dependent on pressure of tumors or liquids, the treatment is limited to the removal of the offending substance, which can only be effected, if at all, through the general system, and by means of absorption induced by discutients, alteratives, and at the same time corroborant treatment, blisters, cathartics, diuretics, &c., although the liquid in many cases might be removed by the mechanical expedient of tapping.

In most cases of solution of continuity there is no time for treatment, death being instantaneous; and in those cases which do survive, success depends, in a great measure, upon the extent and position of organic change; although death is frequently the consequence of injury of a very small extent of surface in apparently a most favorable position. The proper plan to pursue would be to ward off the tendency to inflammation by strict antiphlogistic treatment, and the avoidance of all things which might tend to excite the brain or spinal marrow. Many cases are recorded in which part of the brain has been removed, either by the injury or the hands of the surgeon, and yet the persons have recovered, in consequence, most generally, of a strict adherence to the above-mentioned plan of treatment, to the truth of which in one case at least the writer can testify, which was in the Pennsylvania Hospital, of a young man who was kicked by a mule over the eye on the supra-orbital ridge, crushing the bone and causing the escape of cerebral matter; and who, from the enforcement of this plan by Dr. Fox, completely recovered.

2. INTERFERENCE WITH FUNCTION WITHOUT MODIFICATION OF STRUCTURE.

This is generally mechanical in its nature, arising from a great number of disturbing substances or causes, and is exhibited in a great variety of derangements; consisting in compression of the brain and spinal marrow, or upon different and limited parts of the same, from simple congestion, effusions of blood, serum (active or passive), coagulable lymph, purulent matter, tumors of various kinds, hydatids, compressed bone, as in fracture of the skull, spiculæ of bone, &c.; with the consequent production of apoplexy, epilepsy, catalepsy, chorea, trismus nascentium, paralysis, convulsions of different kinds or degrees, stupor, coma, and death.

Treatment of Interference with Function without Modification of Structure.—In many of these conditions, the indications for treatment are evident, but not, therefore, by any means, always successful. These indications are for the removal of the compressing fluid or body, the correcting of the tendency to a return, by changing the action, and the improving and strengthening the tone of the tissues and general system.

This may sometimes be effected, in compression from congestions and effusions, by bleeding, general and local, cathartics, diuretics, diaphoretics, vesicants, counter-irritation, absorption by means of mercury, when there are no contra-indications, as in the passive dropsies, viz., hydrocephalus, &c., these depending frequently upon a condition of system which scarcely permits of bleeding or mercury at all; and it is only in the active or acute forms, frequently preceding and often terminating in this condition, that they are obliged to be resorted to as the lesser evils; hence another class of remedies are employed, medicinal and mechanical, viz., the preparations of iodine, with tonics and vesicants, cathartics, &c., and the mechanical evacuation of the fluid, by means of compression and tapping, and trephining if the effused fluid be blood. Where tumors are suspected, either one of these plans, except the mechanical, are employed, according to the indications. If they are of an inflammatory character, antiphlogistics, although with caution, omitting mercury; if of scrofulous character, and the patient anæmic, iodine and its preparations, the chalybeates and other tonics, with corresponding hygienic measures.

In those cases dependent upon compressed or fractured bone or spicula of bone, elevation or removal of the bone, by means of the trephine, forceps, elevator, saw, &c., with a subsequent enforcement of the antiphlogistic treatment to its fullest extent, except where there is so much

debility that it cannot be carried into effect, is the course most favorable to recovery.

3. INANITION.

The conditions of system included in this division are very numerous, and present an almost infinite variety of modifications and complications, which may be comprised under the two heads of *Lesions of Nutrition* and *Lesions of Function.* These are frequently so conjoined that it is difficult to determine which is the primary derangement, as in most cases the one accompanies or speedily follows the other.

1st. *Lesions of Nutrition.*—Instances of these may be seen in the sudden drainage which takes place in epistaxis, hemoptysis, hematemesis, menorrhagia, uterine hemorrhage, hematuria, bursting of heart or aneurism, severing of vessels; in fact, hemorrhage from any part and from whatever cause; drains from excessive or perverted secretion and diseased action, as in diuresis, diabetes, diaphoresis, colliquative sweats, seminal evacuations, as in masturbation, excessive venery, nocturnal emissions; blennorrhœa, in its most extensive signification, cholera Asiatica, cholera morbus, cholera infantum, dysentery, diarrhœa, leucorrhœa, gonorrhœa, pus from suppurating surfaces and abscesses, serous evacuations, as in the dropsies (active and passive); bad organization and malformation, either congenital or acquired, as is seen in the scrofulous and tuberculous diathesis, anencephalous and other monstrous productions, insufficient nourishment, either from incapacity of digestion, as is seen in the different forms of dyspepsia, or a partial or entire privation of food, as in starvation, or of certain kinds of food, with the consequent production of certain diseases, such as scurvy, purpura, &c.; inflammatory affections, in the synocha variety, being most marked in convalescence, in the synochus, before and during that period; poisons which produce, as a primary effect, inflammatory action with subsequent prostration, as some of the mineral preparations, of arsenic, mercury, antimony, silver, copper, iron, zinc, lead, &c.

2d. *Lesions of Function.*—These supervene upon mental emotions, excitement, anxiety, &c., affecting communities and individuals, as is shown particularly during and after periods of great excitement or distress, as in sieges and epidemics; upon great mental or physical labor, or both combined, and in degree from the mere fatigue necessarily dependent on an amount of exertion requisite to healthful vigor and repose to that of complete exhaustion and death, or by disturbing the vital harmony give rise to various disorders, which, immediately or ultimately, rapidly

or gradually, terminate in dissolution, such as apoplexy, epilepsy, catalepsy, hysteria, chorea, convulsions, debility, temporary or prolonged, syncope, stupor, and coma, and sometimes sudden death—non-arterialization of blood thus preventing the nervous system from receiving its stimulus, oxygen, instances of which are seen in apnœa from suffocation, drowning; impurity and vitiation of air, as in mines, sinks, wells, &c.; from the burning of coal or other fuel in close places; from large assemblages or numbers of persons in confined or badly-ventilated apartments, halls, cells, or other places (a striking historical example of which is the celebrated "Black Hole of Calcutta"), or few persons, or only one person, in a close cell or other place. The asphyxiated condition of newly-born infants, and the imperfect oxygenation of blood of infants and children, and sometimes older persons, termed "cyanosis." Upon poisons, with the production of the adynamic fevers, such as the intermittent, remittent, yellow, typhus, congestive, &c.; poisoning from bites of rabid and venomous animals, as hydrophobia from rabid dogs and other animals; from serpents, insects, &c.; dissection and other poisonous wounds; narcotics, including under this head, for brevity, all of the cerebral and nervous stimulants and sedatives, such as alcohol, opium, aconite, belladonna, conium, digitalis, tobacco, chloroform, hydrocyanic acid, oxalic acid, strychnia, &c. The preparations of lead, arsenic, mercury, &c., in the production of tremors, or palsy. The habitual use of alcohol, opium, tobacco, &c., producing a species of delirium or tremors, somewhat analogous, as delirium tremens, simple tremors, &c., with sometimes great prostration of both mind and body. The retention in the circulation of excrementitious matter, such as bile, urea, carbonic acid, &c. The remarkable prostration attending coup de soleil, influenza, peritonitis, simple or complicated, erysipelas, &c.; prostration, in fact, preceding all fevers or inflammatory affections, there being a primary adynamic condition, the resulting fever seeming to be an excessive reaction, on the principle *ubi irritatio ibi affluxus.* Injuries—compression and concussion, in every degree, of the brain and spinal marrow, from injuries and wounds of different parts of the body, such as from falls, blows, bruises, &c., of various kinds; operations, as amputations, excisions, &c.; from gunshot wounds, &c., with the production of that remarkable condition termed the shock, analogous to that from electricity, in the form of lightning, &c., blow on epigastrium, draughts of cold water, burns, &c. The removal of the mechanical support or pressure from the nervous system, as seen in syncope, from the sudden arrest of the heart's action; by the removal of large quantities of fluid and solid from off the vessels and nervous system, as seen in the with-

drawal of fluid from abdomen by paracentesis abdominis; sudden extrusion of child from uterus, and by the sudden escape of fluid from sac of spina bifida, either by bursting or tapping; from cranium in hydrocephalus; and from bursting of an aneurism, or in sudden hemorrhage or liquid evacuation from any part of system, though of course the greater effect is produced, in such cases, by the withdrawal of the nutritive and stimulating materials. The exposure to changes of temperature, as cold or heat, in the first producing a state analogous to the stupor from alcohol, and resulting generally in a state of mild or great sedation; but if continued or prolonged, even terminating in permanent stupor, coma and death. The exhaustion, or rather non-production or development of nervous or vital force or power, from want of action or exercise, with the production of that ennui or lassitude so often exhibited in persons of indolent habits or wealth. The debility of old age from the wearing out of the machinery of life, and the consumption of the materials for the production of vital force, &c.

Treatment of Inanition.—The treatment of this condition or conditions will be as various and changeable as the diseases included under this head, and modified according to the type and peculiarities of the morbid condition and patient, although there are some general principles to guide us in our treatment and efforts to ameliorate and modify the abnormal actions and tendencies. Thus, under the head of "Lesions of Nutrition," in drainage from the system, of whatever kind and character, the first indication is to arrest that drain, or rather, in many cases, allay or cure the condition upon which it is dependent, except in some cases where that drainage is a succedaneum, or has become so, as in vicarious menstruation, old suppurating surfaces, &c.;—and thus within itself relieves or cures the deranged action.

In the hemorrhages, the treatment must be varied according to their active or passive character, as in fact it must in all diseases: in the former, it may be necessary to deplete the general system; whilst in the latter, unless the patient is plethoric, which is not generally the case, depletion will, by weakening and relaxing the tissues, assist the hemorrhage; hence it is necessary to resort to styptics, and, at the same time, very frequently to stimulants and tonics, and the class of remedies indicated are those which will produce thickening and coagulation of the albumen and fibrin of the tissues and blood; others to produce contraction of, and give tonicity to, the tissues; and others to diminish or prevent arterial and nervous excitement. Also quiet, rest, position, and temperature must be included as auxiliaries. The remedies thus

indicated are the empyreumatic oils, as creosote, naphtha, turpentine; the preparations of iron, lead (acetate of lead preferred), silver, and sometimes the actual cautery where the hemorrhage is local, ipecacuanha, ergot, matico, alum, tannin, and astringents generally; also cold and warm applications, arterial sedatives, and anodynes.

But it will generally be better to combine several of these remedies to fulfil the various indications; thus, in hemorrhage from any part or organ of the system, in debilitated patients, or persons of feeble vital powers and lax tissues, a combination of an astringent or styptic with an anodyne, and an agent to arrest and hold in check the excessive action of the vital pump (viz., the heart), will be found in most cases to answer the desired purpose of arresting the effusion without debilitating the patient. In hemoptysis, occurring in the above-described persons, I have seen no formulæ more philosophical, or, as far as my experience goes, more successful, than one by my preceptor, Dr. George W. Patterson, of this city (Philadelphia), viz :—

R.—Plumbi acetat. gr. xij ;
Pulv. opii,
Pulv. digitalis, āā gr. ij ;
Misce ft. pil. No. viij.
Signa.—One every two hours till the hemorrhage ceases.

The proportions may be increased or diminished to suit cases. The acetate of lead, comprising the three properties of a styptic, astringent, and sedative, thickens and coagulates the blood, contracts the tissues, and allays excitability ; the opium quiets the general nervous disturbance, and also assists in stimulating the tissues to contraction and supporting them in that condition ; and the digitalis arrests and holds in check the heart's action, thus preventing it from throwing or forcing as much blood to the part, and in this way causing the congestion to subside, and the pressure to be removed from the bleeding surface. For the suppression of this and also other hemorrhages, the ergot is highly recommended by Professor Wood.

In the active hemorrhages, and particularly when the patient is plethoric, it may be necessary to deplete both generally and locally, first to reduce the general plethora ; second, the local ; also cathartics, revulsives, &c., may be employed as adjuncts. However, this course will not do in all cases of active hemorrhage ; as, for instance, in uterine hemorrhage, or hemorrhage from a torn or severed vessel. In the first, we must endeavor to produce contraction of the uterine tissues, and thus close the patulous orifices of the uterine vessels or sinuses. For this purpose, we must resort to ergot alone, or combined with digitalis,

and probably also some remedy to act on the blood, as creosote, turpentine, &c.; frictions, pressure, cold applications to uterine regions, &c.; and it is even highly recommended to pour a stream of cold water from a height of several feet upon the hypogastrium; elevation of the lower part of the body, either by pillows, or by raising the foot of the bed upon which the patient is reclining will also be found useful; tampons, cold injections into rectum, are also employed. In the second, it would, if the vessel should be of any size, be necessary to resort to the ligature. In menorrhagia, active form, the treatment would be similar to that just mentioned in uterine hemorrhage; in the chronic variety, ergot, creosote, turpentine, counter-irritation, tampon, revulsives, cold and astringent injections per vaginam and rectum. Strychnia and electricity also might be employed, as the drain frequently depends upon a debilitated and relaxed condition of the tissues of the uterus; or it may be an accompaniment or dependent upon general debility, in which case the tone of the system must be improved by the use of the above tonics and corroborants, with other measures tending to assist and promote that end.

In bursting of the heart, or aneurism, death is generally instantaneous; but in the latter, by immediate pressure upon the vessel, if it is in a favorable position, and easily reached until assistance can be procured, and the vessel secured and ligated, the patient may be saved, with of course the appropriate supporting treatment subsequently.

Drains from excessive or perverted secretion and diseased action.—In diuresis, the treatment would be modified by the variety; thus, in diabetes, limiting this term to that form in which sugar is developed and evacuated, there is perverted secretion, whilst in diuresis insipidis there is an excessive secretion of the watery parts of the urine, being an increase in quantity; the first being an entirely new product thrown upon the kidneys to be eliminated: other varieties may have other abnormal products or an increase of the solid constituents of the urine, such as albumen, urates, phosphates, &c. In simple diuresis, it will be necessary to stimulate the other secretions, that of the skin and alimentary canal particularly, to improve and give tone to the system, to quiet any nervous disturbance, and endeavor to alter the action of the system generally, according to the indications, temperament, habits, condition of the system, &c. In cases of perverted secretion, we must first ascertain the condition or circumstances upon which the abnormal product or formation is dependent, and on account of the difficulty of so doing, is the unsuccessful treatment of such diseases in some measure attributable. Thus, in diabetes, the digestive organs seem to be in fault, although prominent symptoms

point to the kidneys; but if we look a little further, we might be induced to suspect that it arose from a deficiency of certain materials in the blood, which were necessary to the action of the stomach, and in consequence of the deprivation of which the stomach could not work up the materials of the food to that natural state or condition necessary for nutritive purposes. This view is supported in some measure by the formation of sugar when all materials generally supposed to be convertible into that substance are prohibited. And the writer would here direct attention to the salts of the blood, one of which, chloride of sodium, most probably by its containing chlorine, assists in the formation of the acids in the stomach. This, by being decomposed, forms chlorohydric acid, which assists materially in the digestive function; hence, by exhibiting this and other salts, as the phosphates, or their acids, chlorohydric particularly, in the form of dilute solution or water acidulated with it as a drink, with the other treatment generally adopted, it might probably prove beneficial. This view is still further supported to a certain extent by the constitution of a diabetic bread which has recently been used "with decided advantage" by Dr. James Johnstone and others. It is the receipt of Mr. Palmer, of Birmingham, viz—"Take the ligneous matter of sixteen pounds of potatoes, washed free from starch; three-quarters of a pound of mutton suet; half a pound of fresh butter; twelve eggs; half an ounce of *carbonate of soda;* and two fluid ounces of dilute *hydrochloric acid.* This quantity to be divided into eight cakes, and in a quick oven baken until nicely browned." (Braithwaite's *Retrospect of Practical Medicine and Surgery*, No. xix. p. 113.) The treatment recommended, however, is absolute abstinence from all amylaceous or farinaceous food, in fact, all vegetable substances convertible into those principles or forms, and from them into sugar, except those which are principally composed of ligneous matter, such as cabbages, spinach, &c.; and a strict adherence to animal food, warm clothing, tonics, alteratives, such as the preparations of iron, iodine, and the alkalies; and, indeed, everything to improve the general condition of the system, and stimulate the secretions of the body, those of the skin and liver particularly. Most writers also recommend occasional bleeding to equalize the components of the circulating fluid, but there seem to be objections to this, viz., it debilitates the powers of life, and, of course, the stomach, though appearing at the time to afford relief; and it also prostrates the nervous system by the removal of the mechanical support afforded to it by the fluid, which is necessary to a certain extent to the nervous system, instances of which have been given under the head of "Lesions of Function." I would also suggest the occasional use of injections of nutritive materials per rectum; they would

relieve the stomach in some measure, and at the same time afford an opportunity of ascertaining whether the whole alimentary canal was implicated in this abnormal elaboration of materies morbi.

In diaphoresis, such as colliquative sweats, &c., it is frequently dependent on a depressed state of the system, but of itself assists in debilitating still further; therefore, it will be necessary to improve the general strength, and at the same time prevent the undue action of the skin, for which purpose sulphuric acid in the form of dilute or aromatic sulphuric acid, tannic acid, and compound infusion of roses, are employed with advantage; and, for the general condition, sulphate of quinia is one of the best tonics; also infusion of wild cherry bark, and appropriate hygienic and medical measures, according to the modifications and complications.

In seminal evacuations, if they are voluntary on the part of the patient, the cure will depend upon himself to a great extent. In the first place, the absolute refraining from anything which might excite the discharge, such as exciting thoughts, conversation or reading, coition, masturbation, &c., and the mind and body must be occupied with active employment. If the patient has not moral power to do this, marriage is advisable, thus giving the organs their natural stimulus, which is the only "permanent remedy," according to Professor Jackson. But if married, and the system suffers from the excessive drain or evacuation, he must refrain also, as in the other case, from those thoughts, &c., which excite the passions; and if the mind cannot be diverted otherwise, it would be proper to separate from the wife temporarily by going on a journey; at the same time, to assist in the suppression of those feelings and excitements of the genital organs, lupulin, as recommended so highly by Dr. B. Page, of this city (Philadelphia), might be given. According to his account, it is almost a specific in the suppression of the venereal excitement. The infusion of hops might be substituted in many cases, as it contains the same principle, and, in addition, tonic properties highly advantageous to the condition of the general system. Dulcamara, camphor, conium, and even sugar, are also recommended as antiaphrodisiacs. The treatment recommended by Professor Jackson is, however, very judicious and appropriate, viz., as it is a local affection to some extent, to treat it locally as well as generally, and for this purpose he uses aconite internally, and by injections of the concentrated tincture of aconite, suspended in the mucilage of the pith of sassafras, thrown into the urethra and then pressed down against the neck of the bladder, and held there a short time; but, previously, before resorting to this remedy, he introduces a bougie into the urethra to quiet the irritation, and allows it to remain there about a quarter of an hour; if these should fail to cure, he

cauterizes the urethra by means of nitrate of silver, at the same time, in conjunction with these, employing corroborants, and general improving and strengthening measures. And for this and all similar conditions of the nervous system, he employs and recommends the phosphate of iron; phosphorus being an essential ingredient of nervous matter or neurine.

Although the organic life may not appear in some rare cases to suffer much, yet there may be a state of general inanition of the cerebral and nervous system; a remarkable instance of which came under my notice about a year since, of a young man who was then under the care of one of our best physicians. He was remarkably muscular and well developed, and to look at him one would suppose he was in the enjoyment of most perfect health, and would be very apt to point him out as an instance of superior physical development; but I was informed, to my astonishment, that he was so weak as to be incapable of performing an ordinary amount of either physical or mental labor, and that he had unfortunately contracted the habit of masturbation, and had continued it for some time, though when I saw him he had refrained from the practice for about one year. This case I have seen recently, and from appearances it has greatly improved under the judicious treatment of his physician.

It may well be supposed that I was much interested in this case, particularly as it afforded a fine example of several somewhat analogous cases mentioned by Professor Jackson a short time before in his lectures, as illustrations of the adynamic condition of the nervous system, while at the same time the organic life and muscular system was in a good state of health and development. One case was that of a young lady in whom a little too much exertion or exercise would produce an extraordinary degree of inanition, requiring active stimulation to keep her alive; but by prolonged rest, &c., she would recover, and by limiting the expenditure within the production of vital force, would enjoy apparently good health, and even improve very much in flesh, although the tendency to a similar condition still existed, from a supposed disposition to softening of the nervous tissue, and only required the exciting cause to put it in force. The subject of another case was a young man in whom the organic life was not so perfect, the adynamia being produced by disease, and, therefore, not so strikingly illustrative of the condition referred to, yet interesting on account of its sudden and fatal termination; and although he was so weak as to be scarcely able to walk any distance, and notwithstanding the advice and expostulations of Dr. Jackson, yet the father of the young man could not be persuaded but that he was feigning, and, in consequence, forced him to get on a spirited horse and take a ride, which, of course, exhausted so much of the remainder of his vital forces that there were not sufficient left to continue and support

life action, and, in consequence, a short time after his return from the ride, on the same evening, he died, to the dismay and sorrow of his then repentant parent.

Also after a complete state of paralysis of a part and even almost all of the body, the organic life may be adequate to the support of life for a short time, and occasionally for many years, and the patient may even increase in flesh. An exceedingly interesting and remarkable case is mentioned by Dr. Watson (*Watson's Practice*, pages 350–1), which came under the notice of Dr. Abercrombie, viz., "A servant girl, about twenty years old, sprained her back in lifting some heavy article of furniture. She felt no great inconvenience at the time; but some little while after, weakness of the legs came on, and gradually increased to complete paraplegia. After an interval, the affection extended to her arms, and she then had not a vestige of motion of any of the parts below the head, except a very slight movement of one of the fingers; but the internal functions were all perfect, and her speech was distinct, except that in speaking she was sometimes seized with spasmodic twitches of the lips and lower jaw. She lived in that state, without any change of the symptoms, and her general health continuing good, for about twenty years. In the morning she was taken out of bed and placed in a chair, so contrived as to support her in a sitting posture. Her arms rested on a cross board which passed before her; and if by any accident one of them slipped from this support, she had no resource but to call for the assistance of another person to replace it. In the same manner, if her head fell forward upon the thorax, it remained in that position until raised by an attendant. Her mind was entire. She died after four days' illness with symptoms of low typhus fever." Dr. Abercrombie looked with the greatest interest for the cause of these most remarkable symptoms. "I examined the body with the utmost care," says he, "along with Dr. Pitcairn, who had been in the habit of seeing her for several years; and we could not discover any disease either in the brain or in the spinal cord."

Leucorrhœa and gonorrhœa must be treated by local and general treatment, and modified according to the active or passive form; the former, generally, antiphlogistically, alteratives, &c.; the latter by stimulants, tonics, alteratives, injections, and hygienic measures.

In the choleras, such as Asiatica or epidemic, morbus, infantum, dysentery, and diarrhœa, there are the same general indications for treatment, modified, however, in some measure, by the stage, type, &c. In all of them, the most prominent symptom is the constant discharges per rectum, and in some per oris also, and seeming in

most of them to be the debilitating cause, although it is but a mere effect of the cause, yet does undoubtedly assist that cause in prostrating the living powers and forces. In cholera Asiatica, however, there is a different condition of the circulation from that of the others. Thus, there seems to be a tendency to a modification of the blood, or, as believed by some, a mere separation of the serum or liquor sanguinis from the red globules or hematin, with an exosmotic action through the intestines, excited by a peculiar poisonous principle, or the privation of certain principles in the atmosphere, destroying, at the same time, the endosmotic action and tendency of fluids, &c., to the circulation or interior of the body. Now, it must be evident that, if this is the case, the throwing of remedies and fluids into the stomach must be useless, except those which act through nervous communication; and, therefore, we must resort to some other method of preventing this tendency of the components of the blood to separate, and also to keep up and revive the endosmotic action and power of absorption and imbibition; and as it is notorious that all the usual and tried remedies are incompetent to this, and to the prevention and cure of this disease, I have been forced to the conclusion that we ought to direct our treatment, and the introduction of our remedies into the circulation, through another channel, viz., *the lungs*—and also for this purpose I beg leave to introduce and suggest a therapeutical agent, which, it is believed, will be found to be a more effectual one than any now employed, viz., *nitrous oxide.* I am constrained to the belief, from an examination of the constitution and properties of this substance, that it will not only be found highly useful in this disease, but also in many other abnormal conditions of the system, which will, and the applications thereto, be pointed out hereafter.

This gas appears to have been strangely overlooked and neglected by the profession as a remedial agent. It is well known that it is a powerful, rapid, and permanent arterial and nervous stimulant, exciting an ecstatic feeling, as if we were elevated many degrees above this life to a higher and more refined degree of organization or existence, divested of all the gross accompaniments of this, and this feeling not being followed by that state of sedation or depression which results from oxygen and other stimulants, having properties much more analogous, and therefore more appropriate, to the atmospheric air than any other compound of nitrogen and oxygen, or even pure oxygen, or any other known substance. To prove the permanently stimulating effects of this agent, I have only to quote Sir Humphrey Davy's experiments with it. He, in his own vivid and graphic language, thus describes the effect of the inhalation of this gas upon himself:—" To ascertain with certainty whether the most extensive action of nitrous oxide compatible with life

was capable of producing debility, I resolved to breathe the gas in such quantities as to produce excitement equal in duration and superior in intensity to that occasioned by high intoxication from opium or alcohol.

" To habituate myself to the excitement, and to carry it on gradually, I was inclosed in an air-tight breathing-box; twenty quarts of nitrous oxide were then thrown into the box. For three minutes I experienced no alteration in my sensations; in four minutes I began to feel a slight glow in the cheeks, and a generally diffused warmth over the chest. At this period, twenty quarts more of nitrous oxide were thrown into the box, and well mingled with the mass of air by agitation. In twenty-five minutes the animal heat was 100°, pulse 124. In thirty minutes, twenty quarts more of gas were introduced. My sensations were now pleasant; I had a generally diffused warmth without the slightest moisture of the skin, a sense of exhilaration similar to that produced by a small dose of wine, and a disposition to muscular motion and merriment. In three quarters of an hour the pulse was 104, and animal heat not quite 99.5°, the temperature of the chamber was 64°. The pleasurable feelings continued to increase, the pulse became fuller and slower, till in about an hour it was 88, when the animal heat was 99°. Twenty quarts more were admitted. I had now a great disposition to laugh; luminous points seemed frequently to pass before my eyes; my hearing was certainly more acute, and I felt a pleasant lightness and power of exertion in my muscles. In a short time the symptoms became stationary; breathing was rather oppressed, and, on account of the great desire of action, rest was painful." In a note, it is stated that, in the commencement of the experiment, the gas was too much diluted (" being mingled with near twenty-two times its bulk of atmospheric air,") to have much effect. He remained in the box one hour and a quarter; and he continues—" The moment after I came out I began to respire twenty quarts of unmingled nitrous oxide. A thrilling, extending from the chest to the extremities, was almost immediately produced. I felt a sense of tangible extension, highly pleasurable, in every limb; my visible impressions were dazzling, and apparently magnified. I heard distinctly every sound in the room, and was perfectly aware of my situation. By degrees, as the pleasurable sensations increased, I lost all connection with external things; trains of vivid, visible images rapidly passed through my mind, and were connected with words in such a manner as to produce perceptions perfectly novel. I existed in a world of newly-connected and newly-modified ideas. I theorized—I imagined that I made discoveries. When I was awakened from this semi-delirious trance by Dr. Kinglake, who took the bag from my mouth, indignation

and pride were the first feelings produced by the sight of the persons about me. My emotions were enthusiastic and sublime; and for a minute I walked round the room, perfectly regardless of what was said to me. As I recovered my former state of mind, I felt an inclination to communicate the discoveries I had made during the experiment. I endeavored to recall the ideas: they were feeble and indistinct: one collection of terms, however, presented itself; and with the most intense belief and prophetic manner I exclaimed to Dr. Kinglake, *Nothing exists but thoughts!—the universe is composed of impressions, ideas, pleasures and pains!* Not more than half of the nitrous oxide was consumed. After a minute, before the thrilling of the extremities had disappeared, I breathed the remainder. Similar sensations were again produced; I was quickly thrown into the pleasurable trance, and continued in it longer than before. For many minutes after the experiment, I experienced the thrilling in the extremities; the exhilaration continued nearly two hours. For a much longer time I experienced the mild enjoyment, before described, connected with indolence. *No depression* or *feebleness followed.* I ate my dinner with great appetite, and found myself lively and disposed to action immediately after. I passed the evening in executing experiments. At night, I found myself unusually cheerful and active; and the hours between eleven and two were spent in copying the foregoing detail from the common-place book, and in arranging the experiments. In bed, I enjoyed profound repose. When I awoke in the morning, it was with consciousness of pleasurable existence, and this consciousness more or less continued through the day." Afterwards, he says: "My susceptibility to its power is rather increased than diminished. I find six quarts a full dose, and I am rarely able to respire it in any quantity for more than two minutes and a half."

And also, "whenever I have breathed the gas after *excitement from moral or physical causes, the delight has often been intense and sublime.*" And again, "the pleasurable sensation" in the middle of another experiment "*was for a moment so intense and pure as to absorb existence.*" Davy also speaks of the thrilling sensation being felt in his teeth, as also do others who inhaled it during his experiments.

Dr. Kinglake says, "Among the circumstances most worthy of regard in considering the properties and administration of this powerful aërial agent, may be ranked the fact of its being both highly respirable and salutary; that it impresses the brain and system at large with a more or less strong and durable degree of pleasurable sensation; *that, unlike the effect of other violently exciting agents, no sensible exhaustion nor diminution of vital power accrues from the exertions of its stimulant properties; that its most excessive operation even is neither permanently*

nor transiently debilitating; and, finally, that it fairly promises, under judicious application, to prove an extremely efficient remedy as well in the vast tribe of diseases originating from deficient irritability and sensibility, as in those proceeding from morbid associations and modifications of those vital principles."

Mr. Wedgewood states that before he breathed the air he felt a good deal fatigued from a long ride he had had the day before, but *after breathing lost all sense of the fatigue.*

Mr. M. M. Coates says: "During the rest of the day," of that in which he had respired the gas, "I experienced a degree of hilarity altogether new to me. For *six or seven days afterwards I seemed to feel most exquisitely at every nerve, and was much indisposed to my sedentary pursuits.*"—(*Researches on Nitrous Oxide*, by Sir Humphrey Davy.)

Further proofs might be adduced of the permanently exciting character of this gas, if space would permit; but for further details I would refer to his work on that subject.

In cholera Asiatica, the poison seems to act primarily on the nervous system to depress it, and at the same time to arrest the chemical action going on in the blood, both by its impression upon the nervous system, and also most probably by its destroying the affinities between the components of the blood by catalysis, or by its greater affinity for different parts of the blood; thus probably forming a compound of the poison and serum, or liquor sanguinis, which would be the whitish or rice-water discharges from the stomach and bowels: this fluid or compound having a great affinity for the membranes of the alimentary canal, or from the great vascularity of the abdominal viscera, the fluids having a greater tendency to that part, and when exosmosed through into the canal, by its presence causing an action of emesis or purgation to get rid of it.

In our treatment of this disease, however, without regard to our views of its pathology, we must endeavor to prevent or correct this nervous depression, and also the separation of the blood; and as in other diseases we resort to the setting up of another action to get rid of the diseased, we on the same grounds would resort to an analogous mode in this disease; therefore, the nitrous oxide, by its nervous and arterial stimulation through its chemical and vital action, would, I believe, subvert both the tendency to a separation of the components of the blood and the nervous depression, and consequently prevent or arrest the progress of the disease after it has commenced; that is, before the stage of collapse, provided that collapse is dependent in some measure on the excessive drain; if there has not been any drain, or to a small extent, from the circulation, and the temperature has not been reduced too low for chemical action, even in collapse the nitrous oxide would probably

assist materially in reviving the depressed vital forces, and thus preserve the life of the patient.

In the exhibition of nitrous oxide, however, it should not be used ad libitum or indiscriminately, as it is capable of doing much harm, and particularly where the movements of the living machinery are impeded, or become sluggish, upon mere mechanical principles. Thus, if a body is at rest, or in slow motion, and it is attempted to set that body in rapid motion suddenly, there will in all probability be a rupture or separation of the particles; hence, in the prostrated condition of the system in cholera or any other similar condition, by exciting a sudden or rapid action of the heart and nervous system, death may ensue from actual rupture or solution of continuity of the heart itself, the vessels leading from it, or the parts to which the blood is sent, as the brain, &c.; and also, by exciting vital action too rapidly, all of the free force of vital power may be exhausted before the latent (if the expression may be allowed) is developed and eliminated, and thus again produce a fatal result. Therefore, in using this agent—and the principle is applicable to other stimulants in a similar condition of system, from whatever cause produced—it should be given in small quantities, and at first very gradually; on the principle of slowly introducing steam into the cylinder and gradually increasing it to move the piston and drive the machine.

In this way, in a short time, a considerable quantity of nitrous oxide might be introduced into the system, exciting active and permanent chemical and vital action, and thus overpowering or subverting the action of the poison, and supporting arterial and nervous power until the poison has been eliminated or its influence exhausted, analogous to the treatment in other poisons, such as typhus, opium, &c. During our attempts, or after we have thus arrested the abnormal action, small doses of calomel and opium, with acetate of lead as recommended by Professor Wood, with the addition of strychnia, being one of the most powerful nervous stimulants known, by acting on, exciting and increasing the secretion from the liver and other organs, contracting intestinal and other tissues, and stimulating and supporting still further the nervous system, would no doubt prove highly useful. Also, at the same time, in addition, "electrical insulation," as recommended by Mr. Pallas, might be employed with probably great advantage.

In dysentery, diarrhœa, cholera infantum, &c., if dependent upon irritable ingesta, they should first be removed by castor oil, conjoined or not with opium or its preparations, or, as many prefer, blue mass or calomel, followed by castor oil, opium, &c. If there should be any inflammatory excitement, as is sometimes the case in dysentery, it may be

necessary to bleed from the arm, or by cups or leeches from the abdomen, anus, &c. Also counter-irritation, vesicants, the astringents, opiates, turpentine, Hope's mixture, sulphate of copper, nitrate of silver, &c. In cholera infantum, Dr. Hodge prefers small and continued doses of mercurials. The chalk mixture, or mercury with chalk, particularly if complicated with acidity, and sometimes Dover's powder, are also used. Fresh and pure air, with a removal or occasional journey in the country, is one of the most useful adjuncts.

In all of these diseases, however, the most prominent and primary indication is to arrest the drain as soon as possible, and thus reserve the vital forces; and for this purpose, in diarrhœa, I have found no formula more effectual than a combination of plumbi acetas, pulv. camphoræ, āā gr. j vel. ij; pulv. opii ¼ gr.; made into one pill, and given every two hours, with, of course, in all of these diseases, rest in a recumbent position, and other corresponding measures, one of which is of particular importance, viz., proper clothing, to keep the surface of the body at a proper and more uniform temperature, and to excite and continue the cutaneous secretion.

Another great point in getting and preserving the cutaneous surface in a normal condition is, not only to assist in the cure of the above-mentioned diseases, but to prevent them; and I am convinced that if persons would wear suitable underclothing so as to prevent the temperature, and probably electrical condition of the surface of the body from being readily changed, there would be much less of these diseases. This view was more and more confirmed during the prevalence of the epidemic cholera last summer. I found that those persons who were properly protected by suitable clothing were less liable to any intestinal irritation or evacuations than those who were not; and almost if not quite all persons with whom I came in contact, and who were suffering, were regardless of this point. I recollect hearing a gentleman, towards the decline of the epidemic, remark, "It is strange everybody during the summer has been complaining of diarrhœa and looseness of the bowels. Now it has been the reverse with me, for I have been suffering from constipation the whole summer." He was immediately asked if he did not wear underclothes, and his answer was in the affirmative. This has also been my own personal experience, except for a few days when there was a disposition to increased intestinal action. I have been thus led to consider that by an excess of clothing we may, by increasing the action of the surface of the body, produce to a certain extent constipation, and therefore it should be modified to suit different persons. Dr. H. Hartshorne, in his essay, entitled "*Water* versus *Hydropathy*," suggests also the use of silk, or a combination of wool and silk, as a protection and a non-con-

ductor, to preserve the electrical equilibrium between the earth and objects around us and our bodies, he considering that many diseases and debilitated conditions are caused by, or are connected with, in some measure, the excessive loss of electricity from the body. This idea or opinion is also entertained by many authors of celebrity.

Mr. Pallas, physician in chief to the Military Hospital at Oran, entertains an exalted opinion of "electrical insulation as a curative and preservative means in many diseases," and particularly those of warm climates. He says, "I feel convinced that the great electric currents which exist, either in the atmosphere or on the earth, take an active part in the production of diseases in general, and especially in those of hot climates; and that by modifying the activity of these currents, which are always penetrating the human body, we shall be enabled to diminish, if not actually to destroy, the causes of the endemo-epidemic diseases of Algeria." And if of Algeria, certainly of all other parts of the world. In accordance with his views, "he had two beds constructed whose legs rested on glass nearly a foot in thickness, so that they were completely insulated. To one of the bedposts there was attached a chain, with a glass handle at the free extremity, so that the bed might be completely insulated, or placed in communication with the earth at will." In these, on his first trial, he placed two patients "suffering very severely from an aggravated form of dysentery, and in three hours time there was a marked amelioration of their symptoms." "One of them, who had had four bloody evacuations, with violent colic, shortly before noon," the time of insulation, "did not pass another stool till 8 P. M.; and he improved so rapidly from the time of insulation that in five days he was convalescent." The other recovered, though not so rapidly. "The pulse became considerably slower from the moment of insulation." Two other cases of a severe attack of sporadic cholera and quotidian intermittent fever were cured in three days, by the same means. These were followed by 23 others, with a very happy result, embracing "cases of acute and chronic dysentery, choleriform diarrhœa, intermittent fever, periodic epilepsy, acute articular rheumatism, visceral neuralgia, bronchitis, and meningitis." "It always exerted a favorable influence on the number of the evacuations, and on the heart's action." In consideration of these facts, it would be proper to consider in what other conditions of the system or forms of disease this would be applicable; and as electricity seems to have a close connection with the nervous system and other parts of the body—though having no confidence in the assertion that electricity and nervous force are identical—yet there seem to be good reasons for considering that there are great effects produced upon our bodies by the electrical changes and phenomena in the

air and earth, as shown probably to a certain extent in damp weather—it would appear, by the insulation and consequent retention of that which is constantly passing off, analogous to the passing off in excess of the other materials of the body, that it would be found useful in all adynamic conditions, and particularly in those persons of low vital powers; and in consequence I would recommend the *experiment of such persons sleeping* altogether *on insulated beds;* and in *all forms* of *prostrating diseases* it would also be *advisable* to *try* the *same,* to ascertain whether there is any influence exercised, and if so, to what extent, and in what diseases and conditions most applicable, not neglecting at the same time the long-tried and useful remedies.

In discharges of pus from suppurating surfaces and abscesses, the treatment must be stimulating and supporting, with nutritious and full diet.

In serous evacuations, as in the dropsies, the treatment depends in some measure upon the active or passive form. In the active, it may be the consequence of inflammation and the cure of that condition, and if the system is good and healthy, depletion by bleeding, general or local, carthartics, diuretics, and blisters. But when effused on or in the brain, as a result of inflammation, as is seen in hydrocephalus, it is, generally, immediately fatal, and affords no time for treatment. In the passive form, however, it is generally dependent on mechanical obstruction of the veins, or mere passive effusion from the vessels, the tissues not possessing sufficient vital contractility to retain the fluids. The most obvious course then is, if the effused fluid does not interfere with the continuation of life, to strengthen the vital powers, and through them the tissues, and at the same time to withdraw gradually the excess of fluids from the system by inducing gentle catharsis, diuresis, &c. Where the fluid presses upon some vital organ, as the lungs, heart, or brain, paracentesis is sometimes resorted to, as in hydrothorax, chronic hydrocephalus, abdominal dropsy, &c.; as it is also in an analogous condition, viz., empyema, in which the mechanical effects are the same.

In many cases, however, we find an excess of the serous part of the blood, with deficient plasma and red globules; and although the patients may look round and plump, they are very weak, and incapable of active or prolonged exertion, having occasional œdema of the face and extremities, and incipient indications of serous apoplexy of the brain or other parts of the system. In such a condition, the patient must diminish the usual amount of fluid taken into the system, and modify, strengthen, and consolidate their tissues by using the more solid and nutritious parts of food, assisted by occasional and gentle hydragogue catharsis, if necessary, by tonics, the chalybeates particularly, and other corroborant and hygienic measures.

In bad organization, medicine is not of much service, the improvement of the organism being entirely dependent on the patient, or if a child on its protectors; and in proportion as their knowledge of, and attention to, the hygienic laws, so will be their success in modifying, building up, and strengthening the system; this course, it is obvious, must be continued during life. In malformation, medicine is still less able to perfect the machine, although in some cases, such as spina bifida, &c., surgery, by relieving the condition and placing the parts in apposition, may cause nature to finish the operation.

In cases of disease from insufficient nourishment, as in the various forms of dyspepsia, they must be treated according to their character; thus, if of an inflammatory type, antiphlogistic; if from loss of tone of the stomach, local stimulation or rest, &c.; if of a nervous character, nervous stimulation of the whole system, tonics, &c. When the system has been reduced very much by an insufficiency or entire privation of food, as is frequently the case at sea from prolonged voyages, disasters, &c., it must be given in small quantities at first, and very gradually increased, and in many cases stimulants and tonics will also be indicated as auxiliaries. In purpura, the blood must be enriched by nutritious diet, stimulants, tonics, and attention generally to those hygienic measures which improve the blood and living forces. In scurvy, very frequently, the lemon juice, or juices of other succulent fruits, and potatoes, are adequate to the cure; but it may be also necessary sometimes to assist by improving and strengthening remedies.

In inflammatory affections during the inanition of convalescence, the remedies indicated are of general tonic and mildly stimulating character; during the synochus, it may be necessary to resort to active stimulating and supporting treatment, such as brandy, wine, or wine whey, quinia, nutritious diet, &c. In convalescence, the more permanent tonics, vegetable and mineral. However, in all cases of debility or inanition, from whatever cause produced, in which tonics, and iron particularly, are indicated, the best chalybeate, according to Prof. Jackson, is the following, viz:—

R.—Horseradish, grated, ℥j;
Mustard seed, ℥ij;
Cider, Oj;
Rusty nails, j or ij;
Oxide of manganese, ʒj;
M. Signa.—Teaspoonful twice or thrice a-day.

Also, in connection, the body must be well clothed and protected

from the changes of temperature, with prolonged rest, so as to allow of the re-collection, re-acquisition, or accumulation of life force, &c.

Prof. Jackson illustrates this condition of system in his own ingenious and beautiful manner, by an analogy, which can be understood by the most unlearned. He compares the organism to so much capital in money; this capital is producing a certain amount of interest, and as long as the owner is satisfied to live on or within that interest, his principal is not affected, or accumulates and increases in quantity; but if he expends all of his interest and commences on his capital, according to the expenditure so will be the rapidity of the decrease, until he becomes bankrupt. Thus Dr. Jackson thinks it is with our bodies:—each person has a certain amount of vital capital or material; this produces or develops a certain amount of interest or force; if we live upon or within that power or force developed, we will continue in good condition or even improve that condition, but when, by injudicious exhausting efforts, by sickness, or by the privation of food, this capital is diminished, it becomes necessary to relax those efforts, to correct morbid derangements, and to strengthen and support the system, and build it up by nutrient and stimulating materials, and if this cannot be effected, vital bankruptcy and of course death will ensue. When a person is reduced to this nearly vital bankrupt condition, and even long before, instead of continuing the expenditure, as is unwisely recommended by many persons, and even many in the profession, he (Dr. Jackson) advises that if the person take exercise, the expenditure caused by that exercise should be limited within the generation of force; thus permitting of the re-accumulation of material and power, and ultimately of that quantity necessary to the existence of life and good health. In connection with rest, he also recommends the use of tonics, particularly the formula above mentioned, nervous stimulants, warm clothing, nutritious diet, and attention generally to the organic laws.

The treatment of poisons, producing primarily an inflammatory action, must be first to apply the antidote; second, to produce emesis and prevent inflammation; and third, to correct the resulting inflammation. Thus from corrosive sublimate, preparations of copper, sulphate particularly, give albumen or white of eggs, with the occasional production of emesis, as a large quantity of albumen is said to redissolve the compounds between the antidote and poison; sulphate of copper is also incompatible with a great number of substances, as the alkaline salts, astringent vegetable infusions, &c.; from arsenic, hydrated peroxide of iron, if this cannot be obtained, sesquioxide or protocarbonate of iron. Also magnesia has been recommended; from antimony, or tartar emetic, tannic acid;

from nitrate of silver, chloride of sodium; from preparations of lead, sulphate of magnesia, tannic acid, &c.

One of the best emetics in such cases is the sulphate of zinc, in doses of from gr. x to gr. xxx, although it may of itself prove poisonous in large doses, therefore it should not be given in more than one or two doses; and if it does not operate, substitute some of the vegetable emetics, as ipecacuanha, &c.; the antidotes are, however, alkalies, such as magnesia, &c. Diluents and demulcent drinks must also, at the same time, in all cases, be used to dilute the poisons and protect the mucous surfaces, and also to assist in emesis; this latter process is all important, and it should not be delayed for the antidote. The subsequent inflammation must be treated by the appropriate remedies.

Treatment of Lesions of Function.—In the treatment of lesions of function from mental emotions, anxiety, excitement, great mental and physical labor, &c., the exciting cause or causes must first be removed; and the difficulty of doing this in cases of mental disturbances, arising from the circumstances, position, and trials of life, render it in many cases almost impossible. In such cases, the treatment must be moral to a great extent, assisted by those remedies which soothe and quiet the brain and nervous system, and improve the vital energies. The further exhaustion must be arrested; by a relaxation or complete cessation from labor, to give an opportunity for the system to recover from its debilitated state, assisted in many cases by proper remedial and hygienic measures.

The predisposition to or an attack of apoplexy would evidently be more of the passive kind, there being a predisposition to it from a too great excess of serum, or from a relaxed condition of the tissues, connected with the general state of system. The treatment would be to correct this tendency; and in the event of an attack, active purgation or local depletion by cups, or leeches, blisters, diuretics, &c., exciting the absorbent action in this more mild manner, mercury and general depletion being more or less incompatible with this condition of system, yet might be employed as the lesser evils. Epilepsy from mental emotions, intense study, &c., is of the centric, and, as Professor Jackson believes, of the incurable variety, probably from some "modification of structure," and if so, would be more appropriate under that head. Treatment can, therefore, be only palliative, although efforts ought to be made to cure it; and if all other means should fail, the most favorable course, according to Dr. Jackson, would be for the patient to withdraw completely from the world, and to live a mere vegetative existence, living on the plainest diet, and that

of vegetable matter, refraining from mental or physical labor or excitement of any kind or degree; taking at the same time, to reduce nervous and arterial excitement, aconite and digitalis, with the hope that in the course of time the brain and nervous system might be so modified as to get rid of the tendency to spasmodic action.

Professor Jackson, in his lectures, mentioned an interesting case of a young and highly talented lawyer, who, by intense study, brought on epilepsy. After consulting many eminent medical men both in this country and in Europe, going there expressly for this object, without having derived any benefit from their advice and treatment, he finally called upon Dr. Jackson, who informed him there was but one plan that afforded any hope of success, which was the novel one just mentioned. The young man adopted it, and secluded himself for about two years, by which time he had improved so much, that, contrary to the advice of Dr. J., he violated the prescribed course by an attention to some legal matters, and was in consequence again seized with a paroxysm at night, in which he threw his neck over the side of the bed, and was suffocated. Diet, in epilepsy, must be nutritious and exclusively vegetable. Dr. Jackson says that he has never known a case to get well during the use of animal food. Also the head must be kept cool, and the feet warm.

All of the nervous derangements, such as epilepsy, catalepsy, chorea, convulsions, syncope, stupor, coma, &c., dependent on, or predisposed to, inanition, should be treated with tonics, the mineral particularly, such as the preparations of iron, zinc, copper, bismuth, silver, &c., not forgetting or neglecting the vegetable, as strychnia, quinia, cimicifuga, &c.; also stimulants, antispasmodics, alteratives, corroborants, good and nutritious diet, warm clothing, and all other appropriate remedial and hygienic means for improving the tone of the system, and correcting and removing abnormal tendencies and action.

Those cases of adynamia resulting from non-arterialization of blood, by inhalation of impure or vitiated air, or complete, or partial privation of air, may most generally be relieved by the mere exposure of the patient or patients to fresh and pure air, by ventilation, &c.

In many cases, however, it becomes necessary to resort to stimulants, artificial respiration, electricity, &c.; but in numerous instances, all of these remedies fail on account of the impossibility, by them, of introducing sufficient oxygen in the limited quantity of air taken into the lungs, to excite or continue chemical action or arterialization sufficiently rapid to sustain life; consequently, under such circumstances, it becomes absolutely necessary to have some means by which the vital actions may be sustained until the carbonic acid can be eliminated from the system; and, as this can only be effected by respiration, with the introduction of

oxygen, which by uniting with carbon forms carbonic acid, and in this form is evolved, we should resort to the use of some agent with properties analogous to the atmospheric air, containing more oxygen, and hence more immediately stimulating and more peculiarly appropriate to this condition. Fortunately, such an agent is easily accessible in the form of nitrous oxide, sufficient evidence of the permanently arterial and nervous stimulant effects of which have been previously given. Sir Humphrey Davy supposed, from the quickness and rapidity of its operation, that it would probably become "useful in cases of extreme debility produced by deficiency of common exciting powers." He also remarks, "Perhaps it may be advantageously applied, mingled with oxygen or common air, to the recovery of persons apparently dead from suffocation by drowning or hanging." (*Researches on Nitrous Oxide*, p. 328.)

From the analogy of nitrous oxide, in constitution, to atmospheric air, and its superior stimulating power, I was first led to think of its exhibition in the asphyxia produced by carbonic acid, and in fact contemplated instituting some experiments before I became acquainted with Sir Humphrey Davy's researches; and thus being induced to examine the subject more particularly, my attention was directed to his experiments, which are very extensive and very satisfactory, proving by them that nitrous oxide differs from all other stimulants, to a certain extent, being permanent, and not followed, except in certain tendencies mentioned, by that state of depression which is always the result of stimulation; hence there are many conditions in which it might be usefully employed.

In drowning, particularly, as recommended by Davy, and also in the apnœa or asphyxia induced by inhaling gases from burning coal and other substances, and in suffocation from other causes, as in mines, sinks, wells, &c., where the vital machinery has been impeded or apparently arrested, the ready introduction of this gas into the lungs would most probably excite the respiratory, circulatory, and ultimately nervous functions, and thus rescue the patient from an otherwise inevitable death. In consequence of its valuable properties, and its easy elimination, it would be advisable for the "Humane Societies for the Rescue of Persons from Drowning" to keep an apparatus, with nitrate of ammonia, for its generation and exhibition; and also in the working of mines, in the cleaning of sinks, wells, and other places where accidents calling for its use are likely to happen, the workmen should always have with them an apparatus and material for its generation, having at the same time a small quantity of it ready for use, which could be obtained easily at a trifling expense, so that it could be at hand in cases of necessity, and thus probably save many valuable lives which would otherwise be sacrificed.

There are other cases to which it might be applicable. Thus, in the

asphyxia of newly born infants, there is not sufficient oxygen in the air which enters the lungs to put or keep the machinery of life in motion—like a deficiency of steam for an engine, yet by connecting the cylinder with another boiler containing sufficient, the machinery may be started without loss of time; so in the case of the child, by resorting to an analogous compound to the air, containing more oxygen, and being also a permanent and more active stimulant, hence may in such cases require dilution with common air, life action might be readily excited to that degree to which atmospheric air would be sufficient to continue it.

In cyanosis, also, it might be used with great advantage; but, as in the above case, may require dilution. Adopting Dr. Hodge's view of this disease, viz., that there is deficient respiratory action, and hence not sufficient oxygen introduced into the lungs to perfectly arterialize the blood, by the use of nitrous oxide this deficiency would be supplied, and proper respiratory efforts probably excited. In all cases of children, however, it would require dilution with atmospheric air, and also in many cases of adults; and the rules already mentioned respecting the mode of its exhibition would require more particular observance to prevent injurious effects from rapid stimulation. Its use would also be indicated in all cases of debility or adynamia dependent on deficiency of oxygen in the blood, and also in those cases in which there was a tendency to a degeneration or separation of the components of the blood, and in those diseases or conditions in which by exciting active chemical, arterial, or other action, would subvert abnormal tendencies or actions. To sum up, it may be used, first, to supply oxygen to the blood, where there is a deficiency or privation; second, as an arterial, cerebral, and nervous stimulant; and third, as an alterative, and would be applicable in all cases calling for these indications, there being no complications contraindicating its use.

In the adynamic fevers from poisonous exhalation, either of vegetable or animal origin, one of the most important indications is to support the strength until the poison has exhausted itself or been eliminated from the system, or the cessation of its influence upon the economy, except in cases where the attack is comparatively mild, as it is very frequently in intermittent, remittent, &c.; the supporting and curative means being the same, and acting at the same time, the paroxysms being prevented or arrested in a short time by nervous stimulants, tonics, antiperiodics, &c., as cinchona, quinia, strychnia, opium, &c. In the early stages of intermittent, before the system has become much reduced, nitrous oxide, by its action on the blood and nervous system, would most probably arrest or entirely prevent the paroxysm. In intermittent, Mr. Pallas speaks very highly of "electrical insulation." He says that "cases of intermittent fever—whether quotidian, tertian or irregular, if not

complicated with bronchial irritation—yielded to the sole influence of insulation, without the necessity of having recourse to quinine or any other medicine." In this disease, it is well known that powerful mental impressions, or a consciousness on the part of the patient that he will not have another paroxysm, will frequently prevent it; therefore, further experiments will be necessary before it is received as an established fact, although not wishing in the least to impugn the veracity of Mr. Pallas's experiments and statements, the attempt to, or the addition of any new facts to the mass of human knowledge being highly commendable; and if it is useful in this disease, it will, in all probability, be also in all adynamic conditions, particularly the adynamic fevers.

In typhus, yellow, and congestive fevers, and all similar conditions, the disease runs its course sometimes very rapidly, and, if not arrested, will speedily prove fatal. In all of these diseases there appears to be a tendency to a lesion of the blood, which would account, in some measure, for their intractability to treatment and fatality. Considering that in all such diseases, including cholera, hydrophobia, &c., death is not always the consequence directly of the nervous prostration, but from the permanent change in the blood, from the arrestation or perversion of chemical or other action in it necessary for its perfection, and the consequent prevention or suspension of the process for the formation of plasma, &c., and the production and conveyance of nutriment and stimuli to the nervous system.

The poison appearing to act in an analogous manner to that of the supposed choleraic, either by catalysis or by affinity, but having more tendency to the red and more solid parts of the blood; and the question might be propounded, whether by the action of the poison or disturbing agent there was not a reversion of the fibrin to albumen? as, according to Prof. Chapman, in continued fevers the blood "has *lost much* of its *fibrin*, *salts* and *solids*," this substance, albumen, not being spontaneously coagulable, and easily putrefied; or, as in sudden death from nervous prostration, as stroke of lightning, blow on epigastrium, &c., there being a similar fluid condition of the blood. Hence it might be, and I believe is, the prevalent opinion that the poison or disturbing cause acts in a similar manner upon the brain and nervous system, thus preventing nervous influence from being generated and transmitted to the circulation, and in this way arresting or interfering with arterialization, &c., of the blood, which in turn becomes incapable of stimulating the nervous system, and thus still more assists in destroying life action.

The treatment is, in the early stages, emetics, cathartics of calomel, &c., and subsequently to support strength by stimulants and tonics, such as brandy, wine, wine whey, carbonate of ammonia, turpentine, sulph. of

quinia, &c.; along with the mild diaphoretics, such as acetate of ammonia, and in the complications, opium, Dover's powder, ipecacuanha, &c. At the same time, endeavor to alter the action and stimulate secretions by mercury, ipecacuanha, and opium, or by combining the three, as calomel and Dover's powder, or calomel, opium, and ipecacuanha. The treatment most general is by emetics, cathartics; sometimes depletion, alteratives, stimulants, antispasmodics, diaphoretics, anodynes, &c., according to the stage, type, complications, and modifications.

In those stages or conditions calling for stimulation, uncomplicated with local lesions or inflammation, I would suggest the use of nitrous oxide; there being a failure of the nervous powers and a degeneration of the blood, it would stimulate the nervous system, and thus act analogous to quinia and the other stimulants, being superior to them in the permanency and character of the stimulation, and at the same time, by acting on the blood and producing the same chemical changes as the natural by atmospheric air, except in a superior degree, would, probably by its alterative effects, thus turn the barque of life from the mælstrom of death towards the haven of life and health—stimulating the secretions and supporting the system at the same time by means of mercury, quinia, strychnia, &c., and assisting with the other appropriate treatment.

Influenza is sometimes accompanied by a remarkable state of nervous prostration, a case of which was mentioned by Professor Jackson, of a lady who was unable, for one or two years, to use the slightest exertion without being so much exhausted as to require the use of active stimulants to keep her alive; but, by being at last obliged to follow the judicious advice of Dr. Jackson, with regard to rest, &c., in a recumbent position, she finally recovered her health and strength, after being confined about three years to her room.

For the cure of hydrophobia there is an almost infinite variety of remedies suggested, and many believe in the possibility of there being a specific for the poison; but as this antidote has not as yet been discovered, if it ever will be, we must fall back upon general principles, and first, the pathology necessary to elucidate the principles for treatment. In all writers that I have examined, there are several conditions pointed out as constantly existing, viz., the peculiarly spasmodic action of the throat; the condition of the blood, being analogous to that of the adynamic fevers; the congestion of the medulla oblongata and upper part of the spinal marrow, the poison seeming to have a peculiar or specific tendency to that part of the nervous system; and the tendency to death by asthenia.

The prominent indications would be, therefore, to prevent this change in the blood; to relieve the congestion of the medulla oblongata and spinalis, on which the spasmodic action of the pharynx, œsophagus, &c.,

appears to be dependent; to reserve and support the vital forces until the poisonous action should be exhausted or the poison eliminated from the system; and, to counteract the tendency to death by asthenia.

To do this it would be necessary to excite an action in the blood or system, counteracting that of the poison, as is sometimes done by stimulating the secretions and altering the action of the system by calomel, &c., in other abnormal conditions. To prevent or subvert the change in the blood, therefore, and to support the vital energies, nitrous oxide would be indicated; and if there were no contra-indicating circumstances, might be employed, at the same time exhibiting as an alterative and stimulant to the secretions, calomel, with or without ipecacuanha and opium, or Dover's powder, promoting diaphoresis by the hot-air bath; to relieve the local congestion of the medulla oblongata, &c., by cupping along the back of the neck, and if necessary along the spine, counter-irritation afterwards in the same place. Give aconite or opium internally to quiet restlessness. To keep the patient perfectly quiet, administer everything in solid form, and avoid by all means the excitement produced from offering fluids, passage of air, &c.; supporting at the same time the strength by means of quinia, strychnia, and other stimulants and tonics.

Blood-letting ad deliquium animi is by many highly recommended; but as bleeding is contra-indicated in all cases, except sometimes in the first stages, and then only to a very limited extent, where the tendency to death is by asthenia, it would appear to be also on that account contra-indicated in this disease.

Recently, chloroform has been highly spoken of to quiet the spasmodic action; but as this appears to depend on the changed or changing blood or local congestion, and this changed blood and congestion are assisting in destroying and exhausting nervous power, by exciting these spasms, it would seem to be objectionable, though there is no doubt of its capability in quieting spasmodic action. It would also do so in congestion and inflammation of the brain and spinal marrow, yet it would not cure or relieve that condition, but by its prostrating effects upon the nervous system would rather assist the disease, by taking away the power to resist the abnormal condition and to support life action under the additional pressure.

In a case, however, reported by Professor Jackson, simulating rabies canina, he used it with success; but notwithstanding there were almost all of the hydrophobic symptoms, still he is inclined to the opinion that the case was one of hysteria with the symptom hydrophobia (meaning of the term being *dread* or *abhorrence of water*), and that this symptom may be included in those of hysteria, or other nervous diseases; therefore, he is not prepared to say that this was a case of true rabies canina.

If chloroform should, however, prove beneficial in this opprobria medicorum, it will be a great blessing, and all hypothetical views must give way.

In poisoning from bites of venomous animals, from dissection, and in other poisonous wounds, there is also a great diversity of views with regard to the treatment; but the most general course is—and this will apply also to the prevention of hydrophobia—to apply, if on an extremity, a ligature round that extremity, and immediately a cupping-glass over the wound, or by suction with the mouth—except in hydrophobia, or in other cases if the mucous membrane of the mouth be abraded—to endeavor to draw out the poison, or by producing congestion of the part, to confine the blood and the poison in the blood to the wounded region; then to excise the part completely, re-application of the cup, followed by the application of caustics, such as lunar caustics, white arsenic and sulphur, mineral acids, actual and potential cautery, &c., to produce suppuration and sloughing; at the same time, for internal exhibition, salt and water, sweet oil, alcohol, ammonia, and other alkalies, and arsenic are highly recommended; also in some cases, as from stings of bees, &c., over a large part of the body, antiphlogistics, such as bleeding, calomel, opium, antimony, saline remedies, &c.

Others prefer the stimulant plan of plenty of wine, porter, &c.; for local applications, the caustics, opium, aconite, acetate of lead, emollient applications, &c. But as there appears to be an analogy between the effects of the various poisons, that is of certain kinds, both animal and vegetable, upon the human system, viz., to produce a change in, and a deterioration of the blood, with a tendency to death by asthenia, it would seem that the same general treatment would be indicated, with modifications according to the indications and modifications of the diseased action, viz., alteratives, stimulants, tonics, diaphoretics, anodynes, &c., with the antidote if there should be any known, and an agent to prevent this change or degeneration of the blood; and for this purpose, as well as for its stimulant properties, it would be advisable to use the nitrous oxide as an auxiliary to the other remedies mentioned.

For the stings of bees and wasps, and bites of musquitoes, spiders, flies, and other insects, local applications are generally sufficient, such as salt and water, aqua ammonia. Professor Gibson says that he has often known this latter, applied to a part stung by bees, "act like a charm." Also lead water, rose water, cold water, opium, aconite, &c., will often prove highly beneficial in allaying the pain and inflammation.

From the vegetable poisons, as the narcotics, &c., the first indication is to remove the poison from the stomach, which may often be effected by the stomach-pump or emetics, and large quantities of fluids, par-

ticularly if impregnated with the antidote, before the poison has been absorbed into the circulation, and the introduction of the antidote at the same time. A very good plan would be in all cases to use fluids, impregnated with the antidote, for washing out the stomach. For these vegetable poisons, which are principally, if not entirely, composed of vegetable alkalies, nature has, fortunately, in the same kingdom, kindly provided an antidote in the form of an acid, viz., tannic acid, which forms insoluble compounds with the most of them; hence, by using an infusion or decoction of tannin, or almost any of the vegetable astringents, such as oak bark, galls, &c., or even common tea or coffee, then emetics, diluents, and the stomach-pump, with stimulants, such as brandy, wine, ammonia, and sometimes opium, quinia, strychnia, &c., the patient may, if not left too long, be speedily relieved and placed out of danger. But when the poison has been absorbed into the circulation, in addition to these remedies, dashing cold water on the head and down the spine to remove congestion and thus relieve nerve centres, switching with cloths wet with a saturated solution of salt in water, with sticks, &c., around the buttocks and legs of the patient, keeping the patient in motion all the time to prevent sleep and to keep up nervous power, constant motion alone being sometimes sufficient. Bleeding is also sometimes employed, particularly in poisoning from opium, but great care is necessary not to deplete too much, as the patient may die in the subsequent prostration, which always follow the action of these poisons; and if the prostration from bleeding is superadded, there is still less chance for recovery. The subsequent prostration or inflammation should be treated on general principles according to the indications.

In some of the conditions from the effects of these poisons, opium particularly, there seems to be, from the impression upon the nervous system, an arrestation of the chemical action of the blood, viz., arterialization; hence it would appear to call for the use of nitrous oxide, notwithstanding the congestion of the brain, this appearing to depend upon the non-oxygenation of the blood, and if this should be induced, the congestion would probably subside. This idea is supported to a great extent by the beneficial effects of artificial respiration, and also of electricity, which are generally considered as the only remedies to be resorted to and depended upon after all others fail; and it would no doubt prove useful in all cases of poisoning from this class of substances, not only by its continuing or increasing chemical action in the blood, and thus revivifying it, but by its superadded stimulus to the nervous system, thus fulfilling the indications which are endeavored to be fulfilled by our other treatment.

A very striking case, showing the utility of electricity in poisoning

from opium, is reported by Dr. Martin Barry. A woman gave her child, aged nine months, twenty-five minims of laudanum, to procure sleep. The mother's attention was soon after attracted to it by "its loud breathing;" it was given the breast, and afterwards fell asleep, and for six hours remained in this state. After the expiration of another hour, "the breathing was more oppressed, and the child insensible to all impressions: at eight;" another hour, "its countenance was pale, with an expression of deep and placid repose; eyelids closed;" and the infant appeared to be in a slumbering state, with a tendency to relapse into sleep if roused, "breathing laborious, at times stertorous, or accompanied with a distinct stridor," also "bronchial irritation and expectoration. An emetic of gr. j. of tartar emetic, with gr. v. of ipecacuanha, in solution, was then given alternately until vomiting occurred; at half past eight, another emetic of gr. iij of antimony, and gr. v. of ipecacuanha was given; and flagellations and repeated agitations, together with cold affusions, were employed. The tartar emetic solution was repeated in half grain doses every ten or fifteen minutes, to relieve the chest," vomiting always proving beneficial. "This treatment was continued for two hours; but the restored consciousness was always imperfect, and succeeded by coma when the stimulating influence was withdrawn. At one o'clock P. M., congestion of the brain had increased; all means failed to rouse the patient; the coma was augmented, and the vital energy decreasing rapidly." The electro-magnetic machine "was now had recourse to," by Dr. Barry, "and it was not till the greatest degree of power was used that signs of perfect recovery ensued. The application was continued for five hours. We believe there is no other case on record in which a child under one year of age recovered from so large a dose." (*British and Foreign Medico-Chirurgical Review*, April, 1849, page 387.)

For hydrocyanic and oxalic acids there is not much time for treatment, the action of these poisons on the nervous system being rapid and fatal; yet, in poisoning from the former, it has been found that by the free use of water dashed upon the head and upper part of the spine the poisonous action is somewhat retarded, and is sometimes entirely prevented; and, in some cases, is adequate to the cure. But it is absolutely necessary to resort, also, immediately to the antidotes; for hydrocyanic acid, viz., chlorinated water, dilute solutions of "chlorinated lime, or soda, internally or externally," aqua ammonia very much diluted, and the cautious inhalation of its vapor; and a "mixture of the sulphates of the protoxide and sesquioxide of iron, with carbonate of potassa." When they come into contact with the poison, double elective

affinity takes place, resulting in the formation of sulphate of potassa and Prussian blue. If these antidotes fail or their action is too tardy, artificial respiration, nitrous oxide, electricity, &c. The treatment for poisoning from oxalic acid is similar to that formerly mentioned, consisting in promoting the removal of the poison by emetics, stomach-pump, &c., with the use of diluents and demulcent drinks, administering, at the same time, the antidote—magnesia, chalk, lime water; or, if neither is at hand, a common plan recommended is, to take the plastering from the wall, powder it and give it in water, if lime cannot be obtained in any other way. The resulting prostration and inflammation will require, of course, the appropriate treatment.

The palsy resulting from the mineral preparations of lead, arsenic, mercury, &c. From the first, the palsy should be treated with warm baths, sulphur baths, tonics, aperients, &c.; with mercury, sulphuric acid, strychnia, electricity, &c. That from arsenic with iron, warm baths, aperients, tonics, mercury, strychnia, electricity, &c. From mercury, a similar course, tending to improve, stimulate and strengthen the system, and eliminate the poison; also, lead might be used, these two substances seeming to be antagonistic to each other.

Recently, another remedy has been proposed by MM. Guillot and Melsens, in a memoir to the Académie des Sciences, "the object" of which "is to render soluble the metallic compounds which have entered the economy, by associating them with a body of very easy elimination." This body is iodine in the form of iodide of potassium. "All of the insoluble compounds formed by the salts of mercury with the matters met with in the economy are soluble in iodide of potassium, which substance is easily and rapidly got rid of by the economy. The compounds of lead are also very probably dissolved and eliminated in the same manner; and, in the memoir, cases of saturnine affections so cured are given." It requires to be given in "small and gradually increased doses, as a large dose of the iodide to a dog already suffering from disease from lead poisoning is speedily killed;" exhibited in the former mode, however, "the animal gets rapidly well."—(*Brit. and Foreign Medico-Chirurgical Review*, April, 1849, p. 543.) Probably the iodide will also be found to have a similar effect upon the compounds of arsenic in the system, and it would, therefore, be advisable to resort to it in cases of palsy from this metal, with the same or even greater precautions in regard to the dose.

The adynamia arising from the use of alcohol, tobacco, opium, &c., before there is any great debility or disturbance of system, may be relieved by refraining from the use of such articles; but when the habit

and consequences become too firmly fixed, they may be corrected by substituting other stimulants, given as medicine. These substitutes should be gradually abandoned as the system becomes quieted, and returns to its normal or healthy state. When delirium tremens is developed, it requires more active treatment; and for this purpose there are two plans proposed—one by stimulation with brandy, &c., the other with opiates. Either of these is very useful, but by the combination of both of them, it is most probable that the greater benefit would result.

The suppression of bile, urea, &c.; the first is not comparatively dangerous, and it may generally be eliminated by exciting the secretion of the liver with mercury, taraxacum, nitro-muriatic acid, &c. In the suppression of urea, however, unless the secretion and elaboration is speedily obtained, the patient sinks into a fatal coma from which he cannot be roused, and death shortly results. The treatment consists in endeavoring to produce the secretion of the urinary fluid by the action of remedies on the kidneys, &c., which may sometimes be effected by the different diuretics and corollary measures, such as spirits of nitre, Hoffmann's anodyne, turpentine, and infusion of diuretic herbs in combination, compound powders of calomel, digitalis and nitre, camphor and calomel, warm drinks of chamomile tea, cathartics, &c.; externally, fomentations about the pelvis, counter-irritation in the lumbar region, blisters, &c.; and at the same time it may be necessary to bleed, both generally and locally, if complicated with inflammation. Another instance in which a secretion, differing, however, in its being ordinarily highly nutritious, becomes poisonous, is that of the milk, it being converted, from mental impressions of the parent or nurse, into a virulent and active poison, producing in the child immediate and rapidly fatal effects, affording, generally, no time for treatment.

The prostration attending influenza, peritonitis, &c., is generally complicated with inflammatory action, indicating antiphlogistic treatment; yet it will not do always to resort to this too actively, on account of the tendency to asthenia, and it may even be necessary to support the system at the same time we are depleting; but, in many cases, direct stimulation is necessary to support the failing vital forces. Also, local depletion, blisters, sinapisms, cold or warm applications, iodine, nitrate of silver, lead water, opium, aconite, ice, &c., may be required.

In the shock from compression and concussion of the brain and spinal marrow, coup de soleil, injuries of various kinds, gunshot, operations, &c., the primary condition frequently calls for active stimulation; but this should not be attempted unless, as the least of evils, to support life, because the reactive tendency is to excitement and inflammation, particularly of the brain and spinal marrow, which requires, most generally,

antiphlogistic treatment, although, in some cases, such as from stroke of lightning, blow on epigastrium, &c., the system requires to be supported by immediate and active stimulation, &c.

The disposition to syncope or prostration, from the removal of fluids or solids from the body, may be prevented, to a certain extent, by the substitution of pressure from some other agent, external or internal. Thus the injection of water into the veins of persons who are almost moribund in cholera, seems to have an astonishing effect in reviving the powers of life, and, in some cases, actually to such an extent that the persons have subsequently recovered; and it is very probable that transfusion would prove still more effectual in reviving and preserving life. In view of this fact, it would be advisable by experiment to ascertain whether the nitrous oxide would not continue life action after this partial and generally temporary recovery from venous injection. The value of refilling the emptied vessels has also been successfully demonstrated in cases of hemorrhage; the lives of many persons having been preserved by tranfusion, cases of which are on record, although, in these cases, the transfused fluid being blood must have assisted materially in the recovery.

In paracentesis, parturition, &c., pressure is made by means of the bandage; in hydrocephalus and spina bifida, by the adhesive plaster in addition, although, in the latter, acupuncturation is preferably employed to the trocar, as sudden death will result from the evacuation of the whole of the fluid at one time, as it will often also in hydrocephalus, thus allowing only a small quantity of fluid to exude at one time. The wound is then closed by adhesive plaster, and additional pressure should be made on the tumor by covering it with collodion or with adhesive plaster, the latter preferable, as in hydrocele; taking care, however, that the pressure is not sufficiently great to cause inflammation; and in this way the combined advantages of the evacuating and compressing treatment may be obtained.

In bursting of an aneurism, or hemorrhage from any part which can be reached, pressure may arrest the hemorrhage until the vessels can be ligated or styptics applied; at the same time, the general system may require to be supported by stimulating drinks, &c.

The stupor from exposure to cold will generally pass off without recourse to medical treatment, by a return gradually to a more equable temperature, at the same time continuing the motions of the body; but sometimes it is necessary to resort to frictions, &c., to the surface of the body. Stimulants may also, in some cases, be required, as is well known from the history of the St. Bernard dogs on the Alp mountains.

4th. Sympathy.

For sympathetic action, it is obvious that there must be a predisposition, from excessive excitability and irritability; or a predisposition may be formed from the constant action of the ultimately exciting cause, as in tetanus, and, most probably, also in epilepsy and other convulsive diseases of the eccentric form.

The disturbing causes may be located in almost any part or organ of the body, the part most active, probably, being the alimentary canal, extending over such a vast distance, and affording a nidus for almost every sort of matter, among the most common of which are ingesta, indigestable and fæcal matters, worms, the secretions, &c. Another very prominent apparatus in the production of this state is the generative, particularly of the female, one organ of which, from its constant offending, has given rise to the name of a disease, viz., hysteria, from υστερα, which springs, however, from a great variety of causes acting in any part of system—brain particularly.

The derangements are exhibited in the form of hysteria, epilepsy, chorea, catalepsy, tetanus, trismus nascentium, and the various forms of spasms and convulsions, as seen particularly in children; the frequency of their occurrence in them depending upon the predominance of the ganglionic or excito-motory over the cerebral centres, the controlling influence of the latter appearing to be inversely as the age, although there are periods of peculiar susceptibility, particularly in the female, as puberty, &c.

Treatment of Sympathy.—In all cases of nervous aberration and derangement, the attention of the physician should be particularly directed to the condition of the different surfaces, organs, and apparatuses of the body, to ascertain whether there is any irritation or disturbance in them, which by connection or reflection would excite a similar or exaggerated condition of other parts of the body, and from them implicating the whole system; and of no diseases is this more likely to take place than in those which have been just mentioned; hence the absolute necessity for a careful and accurate examination of the whole organism, before attempting to prescribe for any such derangement, except probably traumatic tetanus, where the cause and condition are evident.

The treatment of these diseases, and in fact all diseases, varies according to the stage of the disease, condition of the system, &c. Thus, for those under consideration, it may be divided into that applicable to, or during the paroxysm, and that during the interval.

In the first, there will generally be found considerable difficulty, the

system being in such a disturbed condition--shown particularly during the paroxysm of hysteria or epilepsy—as to prevent very active interference, in many cases it being better to wait until its cessation, on account of the difficulty of getting any information respecting the disease or patient from persons present, and the impossibility of getting it from the patient; and, in such cases, as much or more harm might be done by the officious interference of the physician as by the disease.

Where, however, the sympathetic condition is evident, and not connected with congestion, or inflammation of the brain and spinal cord, it would be advisable, first, to endeavor to allay spasmodic action and quiet the system by means of the inhalation of the anæsthetic agents, viz., chloroform, sulphuric ether, &c.; but their use must be conducted judiciously, as they are capable of doing much harm; the former might be preferably employed in all cases dependent upon an excess of action requiring direct sedation, it being a direct and powerful sedative; the latter, in those cases of derangement attendant upon, or occurring in, debility, it being a stimulant, would bring the system up to that point in which the nervous actions would be equalized and, consequently, morbid action allayed, analogous to the quieting of the nervous excitement of delirium tremens by opium, alcohol, &c. At the same time, if any disturbing causes are suspected in the alimentary canal, remove such by means of cathartic injections, following their operation by enemata of antispasmodics, anodynes, &c.

The treatment for tetanus is generally more active, and requires more perseverance to correct and hold in check the paroxysms than the other diseases of this class; and in many cases, to our mortification, they cannot be arrested even by the most powerful medicines of the materia medica, the system seeming to have lost its susceptibility to the action of those remedies to which it ordinarily succumbs.

The treatment most generally adopted is to give opiates profusely, even ad saturandum, as recommended by Professor Gibson. The stimulant plan as practiced by the late Dr. Hosack, consisting of the exhibition of brandy and wine in large quantities, has also been found successful in many cases. More recently, the inhalation of the anæsthetic agents has been highly recommended, and has undoubtedly proved very useful.

Other remedies which have been recommended are bleeding, purgatives, sudorifics, caustics, and the potential cautery along the spine, as practiced by Dr. Hartshorne; iron, prussic acid, tobacco, digitalis, strychnia, electricity, and many others of minor importance.

As, however, none of these individually have been very successful, would it not in all cases be better to use a combination of the most

powerful sedatives—and one of which particularly, viz., aconite, its action being somewhat analogous to that of opium, yet more directly sedative, and more specifically directed to the excito-motory system, without so much action on the brain, which is not required, as the cerebral functions are generally unaffected in this disease.

The internal exhibition of aconite, the occasional inhalation of chloroform, and the external application of either of them along the spine, and also to the wounded part, the latter particularly, immediately on the appearance of the incipient indications of the disease, conjoined with the internal exhibition of digitalis in case of much arterial action, would most probably afford more favorable hopes of success than any other plan. If these should however prove abortive, and the declining stage appeared, when the living powers were about failing from exhaustion, it would be proper to resort to stimulants, such as brandy, quinia, strychnia, or electricity, and thus by rousing and supporting the vital forces life might be prolonged and probably ultimately saved.

In this class of diseases, in all cases, during the interval, a very good plan is to correct and modify the actions of the alimentary canal, by removing all offending substances by the use of emetics, antacids, anthelmintics, cathartics, &c., assisted by anodynes, &c., at the same time removing or quieting the disturbances in other parts of the system. If the uterus or other parts of the generative apparatus are in fault, the appropriate remedies must be resorted to according to the indications; also the same with any other portion of the system; and, for this purpose and the general improvement and regulation of the system, it may be necessary to use a great variety of remedies, such as bleeding, general or local, counter-irritation, purgatives, emetics, diaphoretics, diuretics, anodynes, antispasmodics, tonics, and particularly the mineral tonics, such as the sulphates and oxides of iron, copper and zinc, nitrate of silver, subnitrate of bismuth, and the other preparations of mineral and vegetable tonics and alteratives, &c., or a combination of some of these. Great attention must also be paid to clothing, to preserve and regulate the proper temperature of the body, exercise, and diet; and in fact to all hygienic rules.

The diet is so important in epilepsy that Professor Jackson says he has cured twelve or fifteen patients by attention to this alone, confining them however strictly to a vegetable diet, he never having seen a case of this disease get well during the use of animal food—and in the above-mentioned cases the patients recovered without medication, under the use of nutritious vegetable food. The question arises whether these cases were not of the sympathetic variety, and whether, in most cases of sympathetic epilepsy proceeding from irritation or disturbance

in the alimentary canal, &c., the cure could not be perfected by a similar dietetic course exclusive of medicinal treatment?

In chorea, in addition to the above treatment, the vegetable tonics, as, for example, cimicifuga, &c., appear to be very applicable.

In each one of these diseases, in fact, there is some modification which renders necessary the exhibition of one remedy preferable to another, although the same general principles are required to be acted upon.

There is, however, another point to which I wish to draw attention particularly, viz., the local treatment, both as prophylactive and curative. In tetanus, and in many cases of epilepsy, it is well known that the impression or irritation is conveyed from the periphery, or some internal organ or part of the body, to the ganglionic centres, hence called eccentric; and most probably in all cases of epilepsy having the aura epileptica, the origin of the impression will be found to be from some disturbance of the sentient expansions of the nerves, which, from its sympathetic transmission to the nerve centres, breaks or disturbs the chain or connection for voluntary motion, and excites the peculiar involuntary spasmodic action, just as the breaking or detaching the mainspring of a watch, and thus removing the check, will excite or permit a rapid action of the machinery until it runs down—although of course there must have been a predisposition of the ganglionic centres produced either by the constant transmission of the morbid impression from the part or surface affected to the centres, till the impression became the exciting cause, or by some other cause.

In such cases, it would appear obvious that, by preventing the transmission of this morbid impression, the paroxysm would be prevented or entirely cured; and this has actually been done in epilepsy and tetanus by a ligature or tourniquet around the limb, thus compressing the nerve or nerves; by separation of the nerve or nerves proceeding from the part; and by amputation of the extremity from which the aura or impression proceeded.

An interesting case of "Epilepsy Periphera," recorded by Dr. Stumke (*British and Foreign Medico-Chirurgical Review*, January, 1849, p. 265), confirmatory of the same, was produced by a clavus and cured by its removal.

In this case, the "paroxysms came on every week or fortnight. An unpleasant feeling in the toes, proceeding upward along the leg, always preceded the attack. After awhile, the muscles of the entire limb became convulsively attacked; she then fell down, lost her consciousness, and the ordinary symptoms of an epileptic attack manifested themselves, a deep sleep terminating the fit. The *peculiar* kind of *aura* having directed the author's attention to the foot, he found there a *clavus* in an

inflamed and *painful condition.* The patient was confined to her bed, and by various applications the *corn* was in a few days softened and *removed;* and from that period to the present (more than three years) the *attacks* which had latterly occurred nearly daily, *have never returned.*"

This case and the facts before mentioned would tend to prove that eccentric epilepsy, tetanus, and the other forms of sympathetic derangements arise from a primary disturbance or disease of the nervous expansions, or, probably, any part of the afferent nerves, and by the constant transmission of the morbid impression to the spinal marrow and brain, acting first as a predisposing cause, producing a predisposition, thus deranging their functions; and second, as an exciting cause, setting up spasmodic action.

And in this case, the steps or changes from the cause to the ultimate effects, and the cessation of morbid action on the removal of the cause, are very well exhibited; first, by the unpleasant feelings in the toes, which proceeded up the leg to the lower part of the spinal marrow, the functions of which after a time becoming deranged, resulted in spasmodic action in the limb; next it implicated the rest of the spinal marrow and the brain, and general convulsions took place, attended with loss of consciousness; but on the removal of the cause (the clavus), all of the effects ceased, on account most probably of there being only a functional disturbance, the disease not having existed long enough to produce modification of the nervous structure.

In consideration of these facts, therefore, the writer wishes to suggest a plan of treatment which he believes will be found more effectual than either pressure upon or severing the nerves, or excision or amputation of the part or extremity, and not so barbarous as the latter, although acting on the same principle, viz., to narcotize, by means of the local application of aconite, opium, chloroform, &c., the nerves of the part or extremity from which the impression is being transmitted, and keep them thus narcotized till the morbid tendency may be corrected. It is obvious, however, that it will require some short time to get them under the influence of narcotics, and the ligature or tourniquet might be resorted to in the event of an attack in the meantime. If, as in neuralgia, we can allay the sensibility, by local narcotism, we can also most certainly, in the same way, prevent the transmission of impressions as effectually, the action being similar in both cases, differing probably only in degree, and thus arrest or prevent the development or production of spasmodic action, and particularly those formidable forms of it designated by the names of "epilepsy" and "tetanus."

This treatment would also be applicable to all surfaces of the body, internal or external. Thus, if the irritation was in the alimentary canal or

uterus, &c., the internal exhibition, or local application of these same remedies, by injections, poultices, unguents, lotions, &c., would no doubt prove as effectual as the former; and, in fact, the narcotics have been for centuries, and are being constantly given to allay pain, irritation, and spasmodic action, they acting in the same way either by preventing the nervous centres from receiving or sending impressions, or the ultimate nervous expansions from transmitting or responding to those sent from the centres.

The foregoing treatment must, of course, except when used as prophylactive, and even in some cases as curative, be most generally associated with the other general treatment before mentioned, and in this way would most probably be applicable to the cure of all forms of sympathetic nervous aberration, where there had not been any modification of nervous tissue.

LOCAL NEURO-ADYNAMIA.

Local neuro-adynamia, generally, is not fatal, its utmost danger being mostly the loss of the use of the part affected, except it be some vital organ, or connected with the functions of such organ as the heart, lungs, and their immediate appendages, &c.; or it may be a prodroma of a general attack, which is very often the case, and in no disease, probably, more so than in apoplexy, preceding which there may be paralysis of almost any nerve of the body, but particularly the cerebral nerves, which may be so slight and transient as scarcely to attract any attention, or permanent and fixed, and continuing so until the general paroxysm supervenes; but it often exists independently, and separate from any general derangement, so much so that there may not appear the slightest disturbance of the functions of any of the other organs or parts of the body.

In local neuro-adynamia, the active or exciting cause may be at the ganglionic centres, or origin of the nerve or nerves, in some part or in the whole of their course, at their ultimate expansion or ramifications; or it may arise from disturbance in some other part of the system, or from debility or death of nervous mass and tubes.

1st. MODIFICATION OF STRUCTURE.

This may consist of the same as in general neuro-adynamia, and may be produced by and result from the same causes.

Induration and hypertrophy in the nervous tubes in addition may be excited by a ligature or contracting of the tissues, excited by irritation,

inflammation, &c., around them, thus causing a swelling of the nerve, as if it were an attempt at the formation of a new ganglion, producing, most generally, violent neuralgic pains, and also sometimes paralysis, as is occasionally seen in or on pericranium, and different parts of the body, extremities particularly. An interesting case of this form of neuroma is mentioned by Dr. Gibson (Gibson's *Surgery*, vol. ii. p. 432), which came under his own immediate care, viz., one of these tumors, "the size and shape of a goose egg, seated on the inner edge of the biceps muscle, near the middle of the right arm, firm and solid to the touch, movable, but not particularly painful." There may also be swelling or enlargement of the nerves by interstitial deposit of a sarcomatous, tuberculous, or gelatinous character.

From these various forms of "modification of structure," we may have any or every kind of local nervous disturbance, from an excessive neuralgia to a complete paralysis of the parts which the affected nerve or nerves supply, as exhibited in hemiplegia, amaurosis, palsy of one side of the face, or any part supplied by the cranial nerves, asthma, pains in the chest, cough and dyspnœa, difficulty or privation of deglutition, aphonia, paraplegia, sciatica, palsy of one extremity, of one muscle, or a finger, or toe, &c., or paralysis of the sensory (anæsthesia) and not motor functions, or vice versâ; the first, the most rare, as generally, where there is general sensory adynamia, motor power also fails, but the reverse not so much so. And what is also very singular, adynamia of the special sensory functions results on the loss of the general sensibility connected with them, by division or otherwise of the nerve of general sensation of the face and head, &c., viz., the fifth pair or trigeminus; and also if the branch of this nerve, accompanying the nerve of special sensation, have its function destroyed, the function of special sensation also fails, as in the case of the optic nerve, &c. And what is still more singular, if the supra-orbitary branch of the fifth pair, out of the orbit, at or about the supra-orbitary ridge, be severed, loss of vision will result. My preceptor, Dr. George W. Patterson, having seen one such case, suggests that probably "the same result might also follow a violent contusion or inflammation of that nerve." One curious case of the local paralysis (anæsthesia) of the sensory, and not of the motor nerves, is that of a woman who had lost all sensation in her hand and fingers; and as long as she directed her sight to them she could grasp or carry any object, but the moment her attention was directed to some other point, they would begin to relax, and the object would fall, on account of the sensory or afferent nerves not being able to transmit impressions of the condition of the part to the brain. Other cases are mentioned, in one of which this form of adynamia was limited to one arm and one side of the body (Watson's *Practice*, p. 350).

Adynamia of any of the organs may also take place, as of the heart, stomach, uterus, bladder, &c.

And it is probable that angina pectoris is sometimes dependent on neuroma in or about the cardiac and neighboring plexuses and nerves connected with them; Professor Jackson, however, believes that it is dependent on the derangement of the eighth pair, or par vagum, complicated with the brachial plexus; and, according to the degree of change, or the amount of deposition, so would, most probably, be the extent of diseased action, as from a slight difficulty or attack to violent pains, dyspnœa, palsy, and necessarily death, its progress being analogous to neurosis of other parts, viz., alternation of exacerbation, and of apparent health, or feelings of that kind, until the disease is so far advanced that there is no complete cessation of the effects, and death ensues. Dr. Chapman's opinion may thus, in some measure, be found to be true, as he thinks that it is connected with the gouty and rheumatic diathesis.

Treatment of Modification of Structure.—This would be similar in many cases to that of general neuro-adynamia of the same class, the condition of system being the same and the disease being internal.

In softening of the brain, spinal marrow, or nerves, it is obvious that nothing could be done, except, probably, if dependent on inflammation, to endeavor to prevent its extension and thus limit the destruction, although in these cases, unless it were in a single ganglion, nerve, or branch of a nerve, it generally extends, and thus runs into general neuro-adynamia, and consequently death, as is often seen in the extension of hemiplegia, paraplegia, &c.

In hardening or induration by interstitial deposit of foreign matter, by hypertrophy or otherwise, absorption may probably remove the superabundant deposit. This may be effected by depletion, internal exhibition or external application, or both, of mercury, iodine, &c.—the general treatment, however, depending, in a great measure, upon the diathesis, temperament, and condition of the patient. Thus, in debility, &c., the preparations of iodine, with tonics, corroborants, &c.; in plethoric and active constitutions, bleeding, mercury, and other evacuant and reducing treatment. But in those cases of neuroma, or enlargement of a nerve near the surface of the body, as mentioned by Professor Gibson, the treatment as indicated and practiced by him would be most appropriate, viz., the excision or extirpation of the tumor, by severing the nerve, on either side, connected with it, or the application of the actual cautery. In the case quoted, he (Dr. Gibson) removed the tumor; and although "numbness of the arm, forearm, and fingers, amounting almost to paralysis, followed, the wound healed kindly, and in a short time the general numb-

ness disappeared, though it remained in the fingers, which were cold and almost useless for nearly three years; but at the end of that time was entirely removed, and the use of the fingers restored." (Gibson's *Surgery*, vol. ii. p. 433.)

In cases arising from a ligature, it must be removed immediately, and if it has not been on too long, the narcotizing of the nerve, by the local application of aconite, chloroform, opium, &c., may be sufficient to cure it; but it may sometimes be necessary, as in a case mentioned by Dr. Gibson (Gibson's *Surgery*, vol. ii. p. 435), to apply the actual cautery to the wounded nerve.

In those cases in which the nerve is confined and tied down by the tissues, as is seen sometimes on the pericranium, the cutting down upon, severing the tissues, and thus liberating the nerve, will completely relieve the affected part and any abnormal action dependent upon it.

In atrophy, stimulation will give the most favorable indications for a cure, and if there are no contra-indications, strychnia or the occasional use of electricity would most probably excite an increased nutrition and development, improving if necessary the general system with tonics, as phosphate of iron, &c.

In solution of continuity, the only thing is to trust to nature for a cure, taking care to bring and keep the severed parts as near in contact as possible, correcting at the same time any tendency to inflammation.

2d. Interference of function without modification of structure.

This, as in general neuro-adynamia, is generally mechanical in its character, and may arise also from compression of the brain or spinal marrow, or limited parts of the same, and from the same causes, viz., congestion, effusion of blood, serum, coagulable lymph (active or passive), purulent matter, pressure of tumors, bone, &c., with the production of hemiplegia, chorea, derangement of the functions of the thoracic viscera, as heart, lungs, &c., resulting in palpitations or other irregular action of the heart, angina pectoris, syncope, asthma, dyspnœa, difficulty or privation of deglutition, aphonia, &c.; adynamia of the abdominal and pelvic viscera, as stomach, intestines, bladder, uterus, &c.; also, anæsthesia, neuralgia, sciatica, paraplegia, &c.

The "interference" may, however, be limited to a single ganglion or plexus, or even to a single nerve or branch of a nerve, producing either anæsthesia, neuralgic pains, spasms, or complete or partial palsy of the part to which the nerves are distributed, examples of which may be seen in almost any part of the body;—thus from the cranial nerves, may have spasmodic action, paralysis, anæsthesia, or neuralgia, from pressure

within or without the cranium upon the motor or sensory ganglia or nerves; for example, loss of smell, from "interference with function" of olfactory nerves; amaurosis, from the optic nerve; movements and expression of the eye, from abducentes, motor-oculi, and patheticus; loss of sensibility and disturbance, even to paralysis of the special sensory nerves from the fifth pair; paralysis of the masticatory muscles, independent of any disturbance of the facial muscles of expression, from the motor branch of the fifth pair; deafness, from portio-mollis; paralysis of the muscles of the face, from portio-dura; disturbance of the respiratory, circulatory, digestive, and other functions, from the eighth pair or par vagum; paralysis of the tongue, from the hypoglossal, &c.; and thus we might pass in review the whole body, and specify the adynamia of the sensory and motor functions of the different parts of the system.

Treatment of Interference with Function without Modification of Structure.—The treatment will be similar to that of the same class in general neuro-adynamia, and must be modified according to the diathesis, age, temperament, condition of system, locality, and cause of the disturbance, &c.; and hence, in many cases, although the disease may be limited and circumscribed, yet it may be necessary to treat the system generally, whilst local treatment is employed at the same time.

In other cases, local treatment may answer all the indications, and be adequate to the removal of the offending substance, and in this way cure the condition depending upon that interference. Thus, local congestions and effusions may frequently be removed by revulsion and absorption from the application of a sinapism, or more active and permanent irritants, as pitch and cantharides plaster, tartar emetic, croton oil, &c., blisters, cups, leeches, mercury, iodine, &c.

In many cases, however, such as the active effusion upon portio-dura, which most generally occurs from a draught of cold air upon aural region, thus exciting inflammation and effusion of coagulable lymph upon the nerve, it will be necessary sometimes to deplete actively, by the lancet, from the arm, by cups or leeches from the part, and by cathartics from the general system, also employing at the same time mercury to reduce the amount of fibrin in the blood, and to prevent organization in, and to promote absorption of the effused plasma. In numerous cases, although general depletion is indicated, yet it will not do to bleed or give mercury; as, for instance, where there is local adynamia depending on plethora, but that plethora is of a serous character, and may threaten an attack of general adynamia, which may be, and is, generally, first signified by some form of local adynamia. Thus, for example, I was requested by

a gentleman to look at the eye of his wife, who was occasionally attacked with partial and temporary blindness. On examination, I could find nothing the matter with the structure of the eye; but, on inquiry, was informed that she was troubled with headache, particularly about and at the period of the attack. On examining the condition of her system generally, I found her rather embonpoint, yet her skin was pale and waxy, her muscles, though apparently full, were neither hard nor firm. She was incapable of much exertion, being easily exhausted; her vessels were loaded with serum, it being, as might be supposed, in great excess, with a great tendency to passive effusions, from the debility of the tissues. I concluded that it was a case of threatened serous apoplexy, showing itself in the form of amaurosis, caused by the pressure upon the optic nerve; and, in consequence, I prescribed a hydragogue cathartic—not an active one, however, but sufficiently so to produce a moderate amount of drainage, to relieve present symptoms—and, as I found that she was in the habit of taking large quantities of fluids, in the forms of coffee, tea, soup, &c., I requested her to diminish the quantity to the smallest amount necessary for her wants, leaving the daily secretions and excretions to remove and equalize the remaining quantity; and at the same time to endeavor to strengthen and consolidate her tissues and enrich her blood by more solid and nutritious diet, which course, it is obvious, in such a system, must be continued during life, to correct and prevent the tendency to a return. Tonics were also indicated, and particularly the chalybeates; but as she was averse to taking medicine, I did not order any further, and she is now, after the lapse of several months, comparatively well, the amaurosis and oppression of the brain having entirely disappeared. She subsequently informed me that she had been bled at a former attack, which relieved the symptoms, but debilitated the system generally, as might *à priori* be supposed; and she felt much worse after than before the bleeding, the extracted fluid being almost all serum, with very little crassamentum.

In cases of tumors, they must, if they cannot be removed by local application of discutients, or mechanically, be treated on the same general principles as those before mentioned in the same class under the same head in general neuro-adynamia.

Bone, splinters, &c., may be generally removed mechanically, by means of the trephine, saw, knife, forceps, &c.

3d. Inanition.

This, as in general neuro-adynamia, may be from want of nutrition, or stimuli, or from loss of function, rendering nervous matter incapable

of receiving nutrition or responding to stimuli. The first, viz., *Lesions of Nutrition*, may be exemplified by the Fakirs of the East and other devotees, who, from false and misguided views, lose the use of their limbs or other parts of the body by maintaining them in one position, generally an upright or extended one, for a long time, thus draining the vessels and keeping them empty, or comparatively so, until the parts become atrophied or debilitated to such an extent as to become incapable of responding to impressions, or the dictates of the will, &c.

A similar condition is often temporarily produced by accidentally arresting the circulation to or in a part; as, for instance, to the arm or leg, when it gets in that condition commonly called "asleep." An analogous condition may result in any organ or part of the body, if the blood should be prevented from going to that part or organ.

In anæmia, although there may be an abundance of fluid, yet that fluid does not contain sufficient nutritive plasma, or stimuli; and in consequence, there may be an adynamic condition of almost any organ or part of the system, as well as the whole organism, exhibited in the form of headache, hemicrania, neuralgia, blindness, deafness, perverted sensations, or complete anæsthesia, or mere debility of the different parts or organs, as heart, stomach, uterus, bladder, &c., or local spasmodic or other perverted action, as chorea, dyspnœa, asthma, difficulty or privation of deglutition, &c., or mere tremor, as of the head or some other part, or partial or complete paralysis, as paraplegia, &c.

The same condition may be produced by drains, as hemorrhages, excessive lactation, seminal evacuations, or profuse secretion, or evacuation of any kind—all or any of these giving rise very frequently to amaurosis particularly, and in fact adynamia of any part, organ or function of the body. And in none is it probably more often exemplified than in the one which has just been mentioned, viz., the adynamia of the optic nerve, it seeming to be sooner affected than almost any other part of the system, as if it was intended by its prominence to report to, and warn us of some violation of the organic laws, the effects of which are thus forced upon our attention.

2*d. Lesions of Function.*—These, as in the general division, may result from mental disturbances of any kind, either of an exhilarating or depressing character, and also from great mental or physical labor, or prostration from any cause, with the production of derangement of any part or organ of the body, as well as of the whole body, thus causing an adynamia o the actions of the heart, with syncope, or a more permanent debility o its powers; of the uterus, os uteri and sphincter of vagina, causing abortions, which are very frequent during and after periods of great excite-

ment, as from epidemics, sieges, &c., or from the ordinary accidents of life. Also the relaxation of the other sphincters, as of the cardiac orifice with vomiting; of the rectum and bladder, with the consequent expulsion of the contents of the bowels and bladder, which are frequently the effects upon new recruits in a first battle; and the same effects also result in children and even adults from the ordinary excitements and impressions of life. Also local spasmodic action, as chorea, &c., confined to the greater portion of the body, limb, or even a single muscle, or partial or complete paralysis of the same. But there is also another condition which is not so often exemplified in local as in general adynamia, viz., in which there is debility without any perceptible cause, constituting that condition generally called "inanition," as of the heart, uterus, bladder, rectum, intestines, &c.; of the functions influenced by the cerebral nerves, as partial or entire privation of sight from debility of the optic nerve, or motor oculi, the latter allowing the iris to expand and thus admitting too many rays of light; deafness from debility of portio-mollis, &c.; and also the other functions depending upon these nerves, as the movements of the tongue, eyes, facial and masticatory muscles, &c.; paralysis agitans of old age, limited to the head, hands, legs, or any other part of the system. Also anæsthesia, and many forms of neuralgia where the general health appears to be good, as hemicrania, cephalalgia, sciatica, pains in the chest and in various other parts of the body, &c.

From electricity, as shown particularly in the effects of lightning, or from any other depressive cause, as concussion from falls, blows, &c., with the production of almost any form and degree, and of any part, of local spasm, anæsthesia, palsy, &c., thus hemiplegia, paraplegia, chorea, blindness, deafness, aphonia, dyspnœa, dysphagia, debility of heart, uterus, bladder, bowels, &c.

From local application and general exhibition of narcotics. This state is, however, most generally induced for medicinal purposes.

From poisonous action of the metals with paralysis and anæsthesia, as from lead, mercury, &c., often confined to the wrists and hands, but may also take place in the lower extremities, or any other part of the body, and be complicated with spasmodic action, of the intestines particularly, from lead, constituting the disease termed colica pictonum.

Treatment of Inanition.—In many cases of local inanition, although the diseased action or debilitated state be limited, yet it will require general treatment on account, in many cases, of the difficulty of affecting the parts by local remedies; in numerous cases, however, the local affection or condition may be remedied by local treatment.

Treatment of Lesions of Nutrition.—In Lesions of Nutrition, where the adynamia depends upon an arrestation of blood, if from any mechanical cause, the obvious indication is to place the parts in a proper position, or remove obstructions and thus permit the reflow of the blood, when all the symptoms will generally soon disappear, if the cause has not been continued too long, accompanied, however, by a peculiar tingling or prickling sensation as the circulation returns, being dependent most probably upon the stimulus of the blood, or oxygen in the blood, as it steals through the capillaries, and impinges on the sentient extremities of the nerves, analogous somewhat to the sensation from tickling; but if in the latter case the part be grasped more rudely, or in the former the blood be forced upon the nerves in a larger quantity and with greater impetus, by concussion or otherwise, its pressure removes that peculiar almost unbearable feeling. This same feeling seems to be experienced to some extent in the return to sensibility from paralysis or anæsthesia.

As this state of anæsthesia is so easily produced in the extremities by pressure on the vessels, the question arises *whether it could not be applicable for some practical purposes in the performance of operations*, and thus supersede in some measure the necessity for the general anæsthesia artificially induced?

In cases, for example, of required amputation of an arm or leg, or any part of them, by the preceding use of the tourniquet around the limb compressing the vessels of that limb, in a few minutes would arrest the circulation and thus produce a palsy and loss of sensation in it, and the operation might be performed with comparatively little shock to the system, and probably little or no sensation to the patient.

In local adynamia, as a consequence of anæmia, the first indication is to improve the blood and through it the system, and if there is an excess of serum to equalize the circulation. This may in the former be affected by stimulants, tonics, mineral and vegetable—the former particularly—alteratives, and those remedies which seem to have a more specific tendency to the different parts or organs affected; also diet, dress, and other hygienic measures. But in many cases after the blood is enriched and the system improved the local affection is not cured or relieved; it may then be necessary to resort to strychnia or electricity, to disturb or remove the inertia, or in similar cases combine the use of these with the other remedies above mentioned and at the same time.

In those cases in which there is an abundance or preponderance of serum, it might be supposed that removing the excess by bleeding or active purgation would relieve the condition and assist in the more rapid recovery, but on experiment this would be found to prove fallacious, except there were local congestion, &c., there being to some extent an

advantage in this condition of general plethora from serum, as by the mechanical pressure of the fluid upon the brain, &c., it probably prevents frequently the disposition to syncope, which is often experienced by persons in the anæmic state; and it may be from the want of the due amount of pressure or support from the fluids or blood-vessels upon the brain and nervous system, &c., as, in cases of spurious and in some of chronic hydrocephalus, pressure relieves and cures the disease; they differing, however—in the former requiring pressure from within, by refilling the vessels and by stimulation and improvement of the system; the latter from without, judiciously graduated, to support and at the same time to cause absorption of the accumulated fluid; and in anæmia, the brain and nervous centres acquire strength as the blood becomes richer and more abundant, thus filling the vessels, and by its pressure supporting and steadying the nervous system, at the same time affording nutrition and stimuli, which of course is the most beneficial. Other examples have been given in the preceding pages, as the injection of fluid in the veins in cholera, and the transfusion of blood, &c. This condition is also shown by the fact of some persons being able to hear distinctly when their heads are filled with blood, either from excitement or by a recumbent position, whilst in a standing position they are deaf; also in the fact of placing persons in a state of syncope in a recumbent position to cause a greater flow of blood to the brain and thus revive them.

In those cases resulting from drains from the system, they must first be corrected, and the same general course, as before mentioned, pursued to improve the system, at the same time avoiding all causes which produce such drains. Thus, in lactation, the child must be weaned or provided with a nurse; in seminal evacuations, either from excessive venery or masturbation, they must be avoided; and in excessive secretions, hemorrhages or drains of any kind, except as succedanii, must be arrested by the appropriate treatment, according to the character of the discharge, &c.

Treatment of Lesions of Function.—In these cases, where there are complications with general debility, or bad state of system, the treatment must be similar to that of "lesions of nutrition."

Where there is merely functional debility, without any general complication or local inflammation, &c. (except probably in the chronic variety of the latter with loss of tone, as in diarrhœa, dysentery, &c.), or after the effects of inflammation or concussion, &c., have been entirely removed, yet the adynamia remains, there are no remedies which are probably superior to those of strychnia and electricity (including in this latter term, for brevity, all the analogous agents); and it is only in these cases in which they appear to be at all applicable, although

they have been used indiscriminately in almost all forms of adynamia, both general and local, and in many cases with injury, which must necessarily result when the adynamia is dependent on some "modification of structure," or physical disturbance; hence by many they have been thrown aside as useless or injurious; but, on account of our deficient or limited knowledge of physiology, pathology and therapeutics, the fault is probably rather in the application of than in the remedy. The same might be and is said of opium, mercury, the lancet, &c., but it does not prevent the judicious practitioner from resorting to them when the indications call for their use. In general terms, these remedies are applicable in all cases of local and also general adynamia, where there is no modification of tissue, inflammation, &c., or physical impediments or disturbances, or where these have been removed and the inertia still remains, particularly in those cases in which the connection between the voluntary and involuntary movements are not entirely broken. Where the connection is severed, they seem to be particularly injurious, as their tendency is directed more especially to the involuntary actions; thus, if strychnia is given in complete paraplegia, &c., it appears to increase the disease and separate still further the voluntary from the involuntary movements, and hence prevents the reunion; but in a case of functional debility, where the two have not been separated, it is particularly applicable, as its action is directed primarily to the weaker part, or the debilitated nerve centres appreciate or respond to its stimulus the sooner.

In those cases, however, of adynamia of the involuntary organs, as of the heart, intestines (as in chronic diarrhœa, dysentery, &c.), bladder, &c., strychnia seems to be peculiarly appropriate, and acts more specifically than any other remedy in giving tone and strength. In many cases in which general treatment is also indicated, it would no doubt be usefully combined with the other tonics, &c.

Electricity is also applicable to many of these local forms of adynamia, and has been used with success in amaurosis, chorea, uterine inertia or paralysis, and almost every form of local prostration or inanition, where this condition was merely functional, and the general health was not deranged or had been improved. This latter appears to be a point of some importance, and the neglect of it will probably explain the reason of the failure in many cases of treatment and remedies, and of these two more especially, viz., strychnia and electricity, the latter particularly; the former at the same time that it is acting on the adynamic part is also improving to a certain extent the general condition, hence the advantage, in many cases, of its combination with the other tonic preparations and stimulant treatment, in both general and local adynamia.

In all cases therefore in which such remedies are indicated, it will in the first place be necessary to ascertain the condition of the general system; if this be good, the use of them will no doubt prove immediately beneficial, if not curative; but if the condition of the system is bad or below the natural healthy point, the general health should first be corrected, and by the subsequent use of such remedies, the local affection or inertia may most generally be removed or corrected, if it has not been, as it often is, remedied by the general treatment, the local affection being in numerous instances dependent upon the general derangement or debility, and disappearing upon its correction.

Ergot is also highly beneficial in the inertia of the uterus and bladder, acting almost specifically in the former, particularly in the debility frequently attendant upon and resulting from parturition, in the retention of the placenta, and in the arrest or prevention of uterine hemorrhage; and from analogy it might be supposed that it would also prove useful in local adynamia of other organs, as the heart, &c.

For the prevention of abortions, mental quietude, anodynes, antispasmodics, tonics, &c., and other treatment with general hygienic measures, modified by the condition of system, temperament, habit, &c., of the patient.

Those cases resulting from the metals, such as palsy, lead colic, &c., must be treated on the same general plan as described in the general division, viz., avoidance of the exciting cause, bathing, exercise, tonics, strychnia, electricity, &c.; the iodide of potassium, as recommended by Messrs. Guillot and Melsens, cathartics, &c. In lead palsy and colic, in addition, the sulphates of magnesia, of alumina and potassa or common alum, with the use at the same time of the preparations of mercury, &c.

The adynamia resulting from narcotism will generally disappear if the exciting cause is removed; but it is applicable to a great variety of useful purposes both in surgery and medicine; thus for instance to the relaxation of the sphincters, &c., and for this purpose the class most appropriate is that of which belladonna is the type, and may be used for the dilatation of the iris, of the air-cells of the lungs, of the intestinal fibres and rectal sphincters, of the os uteri, of the perineum in labor when the child's head presses too hard upon it, thus permitting its easier passage, and removing the greater tendency to the rupture of that part; of the abdominal ring in the reduction of hernia, &c. From the rapidity and certainty of its action, atropia in solution would be most appropriate in the majority of these cases.

The application of atropia, &c., externally in hernia, to allay the irritation and relax the constricting tissues, and the exhibition by the mouth, and by injection per rectum, of astringents and stimulants, as tannin,

acetate of lead, opium, &c., to contract the intestinal tissues, and thus withdraw the incarcerated intestine through the stricture, assisted by position, and, if necessary, the taxis, would most probably afford a safe and effectual mode of reducing hernia, without, in many cases, the necessity of resorting to other means, or an operation.

In other cases where local anæsthesia only is desired, another class would be more appropriate, the type of which is aconite, chloroform, or even opium; in such cases as neuralgia, &c.; the application to tumors and surfaces before excising or cauterizing them, such as carbuncles, &c.; abscesses before opening them; to mammary and other glands before excision; to piles before strangulation, &c.; and it is probable that local anæsthesia might be substituted in most cases of minor surgical operations, instead of resorting to the, in many cases, unnecessary and frequently dangerous general anæsthesia so indiscriminately induced at the present time, and occasionally with such injurious and even fatal effects.

There is another application of local anæsthesia, viz., as a prophylactive, before operations, particularly those involving the serous membrane, as the peritoneum in paracenteses, hernia, &c.; wounds or injuries, where not too extensive, to prevent the supervention of tetanus, irritative fever, inflammation, &c., which result as a consequence of the above.

Where the wound, &c., is very extensive, the substitution of water impregnated with aconite or other sedative, for the more concentrated narcotics, &c., would prove no doubt highly advantageous, or water alone, as used so extensively and beneficially at the present time as a dressing, probably owes its virtues to its acting to a great extent in a similar manner, by producing a state of sedation of the nerves, at the same time contracting the tissues, thus regulating the quantity of blood in the part, and in this way preventing too extensive irritation or inflammation. An eminent surgeon, Sir A. Cooper, speaks very highly of it as a prophylactic against tetanus. He states that "he has never seen tetanus come on when wounds, however severe and likely to produce it, were healed under water dressing." (*Water* versus *Hydropathy*, by Dr. H. Hartshorne, p. 115.)

4th. Sympathy.

The predisposition in this may be induced in the same way as in general sympathetic adynamia. The disturbing or exciting causes may also be located in any part or organ of the body, and the irritation thence reflected to any other organ or part of the system, thus producing local derangement of any or of every kind, exhibited in the forms of cho-

rea, which may be confined to an arm or leg, fingers, single muscle, or any other portion of the body, or almost all of it, local spasms, amaurosis, deafness, or disturbance of any of the cerebral nerves, thus deranging the actions of the parts to which they are distributed, producing either excessive or deficient or entire privation of motion or sensation. Also adynamia of some of the organs, as the heart, with arrest of or impeded action, from sickness of stomach, or from action of remedies, as digitalis, antimony, &c.; stomach, with vomiting from pregnancy, sea-sickness, &c.; uterus, with the production of abortion from the relaxation of the sphincter of os uteri, from cerebral, spinal, and intestinal impressions, &c.

Another class which does not strictly come under the head of adynamia, yet is often indicative of that state, as proved by the juvantia and lœdentia, viz., neuralgia, in its various forms of hemicrania, sciatica, cephalalgia, &c.

In many cases, there may be a complication of symptoms, particularly about the head and thorax, &c., with impeded action of the muscles of respiration, &c., such as dyspnœa, asthma, neuralgia, &c., or convulsive action or paralysis, with or without anæsthesia of the face or some parts of it, or any parts of the body.

Treatment of Sympathy.—This must be in many respects the same as that mentioned under the same head in the general division. The cause and its location must first be ascertained and removed, if possible, and if it cannot be removed, as sometimes in sickness of stomach from pregnancy, must be palliated, till the condition upon which it depends has terminated, by, occasionally in the case of pregnancy, expulsion of the contents of uterus. This palliation or quieting may be effected in many instances in pregnancy by stimuli, as champagne wine, tonics, &c., but in the majority of cases, which would, however, seem to be cases of hyperdynamia, by anodynes, which, by coming into direct contact with the nerves of the stomach, narcotize them, and thus prevent their responding to those transmitted impressions, or by entering the circulation, act upon the whole nervous system, and in this way allays, temporarily, the disturbance; and in all such cases of sympathetic derangement, where the cause appears to be internal, the internal exhibition of anodynes would be indicated, except where the disturbance arose from irritable ingesta, secretions, worms, &c., in alimentary canal, when they must be preceded by emetics, cathartics, antacids, vermifuges, &c. In cases of chorea and analogous affections, this treatment should be preceded or accompanied, premising always that the offending substance or condition has been removed, which is of itself often adequate to the cure, by tonics, both mineral and vegetable, chalybeates particularly, alteratives and general hygienic

measures, unless resulting from inflammation, congestion, &c., when it must be treated antiphlogistically.

In all those cases, however, in which the exciting cause is external to the part to which the sensations or impressions are reflected, it may be quieted on the same general principle by the local application of the sedative to the punctum irritatio, thus by the induced narcotism preventing the nerves of the part from transmitting impressions. The anodynes most appropriate and useful in these conditions are aconite, opium, chloroform, camphor, &c.

In all those cases of paralysis, spasmodic action, &c., as amaurosis anæsthesia, twitching, &c., it may be necessary to stimulate by means of nervous stimulants, tonics, &c., as musk, particularly in that spasmodic contraction of the diaphragm, the effect of which is known as "hiccough," valerian, quinia, strychnia, electricity, &c.; always removing previously of course the exciting cause, and particularly before using either strychnia or electricity.

Many of the sympathetic disturbances depend on anæmia or debility, and by curing this condition will disappear, such as sciatica, hemicrania, cephalalgia, spasmodic and other irregular actions, &c., hence tonics, particularly the chalybeates, nervous stimulants, corroborants, proper diet, dress and hygienic measures generally. For some cases of hemicrania, however, Dr. Watson (Watson's *Practice*, p. 444) highly recommends the muriate of ammonia, in "ʒss doses, dissolved in water, three or four times a-day," to the beneficial and speedily curative effects of which the writer can testify in one case which came under his care. Dr. Watson states that "if the pain does not yield after four doses, you may cease to expect any benefit from it."

Many cases of neuralgia, of the chest particularly, have been cured by Professor Jackson by the simple addition of clothing; thus, according to his directions, having a jacket quilted with lamb's wool or cotton, and wearing it next the skin, will often relieve the affection like a charm, causing the pain to subside when everything else had failed. Probably silk clothing, or silk and woolen combined, and worn next the skin, would also have the same beneficial effects.

With respect to "electrical insulation" in neuralgia, Mr. Pallas remarks that "its most marked and speedy effects were exhibited in neuralgia." (*British and Foreign Medico-Chirurgical Review*, No. vi. p. 386.)

Those cases depending on inflammation or congestion, antiphlogistics, counter-irritation, astringent and anodyne applications, &c., will often relieve. These latter cases may and often do cause a complication of symptoms:—thus, a very interesting one was afforded me by the condi-

tion of a medical friend, who, after convalescence from an adynamic fever induced by the inhalation of chloroform, and in fact during his illness, but not to such an extent, was troubled with pain in the chest, coughs, dyspnœa, &c., so much so that his friends imagined him to be phthisical. As he had, however, soreness along the spine, and particularly about the origin of the phrenic nerves, I was induced to believe that those symptoms were sympathetic, and resulted from a passive congestion with a subacute inflammation of the spinal cord, and in consequence recommended him to apply a large pitch and cantharides plaster along the spine, which he did, and with the happiest effect. All of the pulmonary symptoms began gradually to subside as the plaster acted, and ultimately, under its use, entirely disappeared. Since then, I have had another opportunity of observing a similar state of things, in the person of the same gentleman, who was attacked with neuralgic pains down his arms and through his chest, and other unpleasant feelings throughout the system, with a general malaise, which he believed would be all removed by a cathartic dose of calomel and jalap, which operated, and notwithstanding ptyalism supervened unintentionally, yet those pains and unpleasant feelings, &c., did not disappear until counter-irritation along the spine was employed.