A NEW FORM OF

NERVOUS DISEASE

ESSAY ON

ERYTHROXYLON COCA

SEARLE

A NEW FORM

OF

NERVOUS DISEASE.

TOGETHER WITH

AN ESSAY ON ERYTHROXYLON COCA.

BY

W. S. SEARLE, A.M., M.D.,

FELLOW OF THE MEDICO-CHIRURGICAL SOCIETY OF NEW YORK, ETC.

NEW YORK:
FORDS, HOWARD, & HULBERT.
1881.

TO

H. B. MILLARD, A.M., M.D.,

THE PLAYMATE OF MY BOYHOOD, THE COMPANION OF MY SCHOOL AND COLLEGE DAYS, MY FELLOW-STUDENT IN MEDICAL SCIENCE AND ART, AND THE LOVED AND HONORED FRIEND OF MY RIPER YEARS,

THIS VOLUME

IS

Affectionately Dedicated

BY

THE AUTHOR.

PREFACE.

Much of the substance of the following pages, after being read before the Medico-Chirurgical Society of New York, appeared in a New York medical journal during the years 1879–80.

The ideas and opinions therein expressed provoked considerable criticism, both favorable and adverse—chiefly the the latter. That of Dr. Hammond and of Dr. Beard will be found in the body of the essay. The main stress of this criticism was directed against the assertion of the writer that he had discovered a new disease. Still confident, however, of the correctness of his opinion, the writer determined to bring his thesis under the notice of Professor Charcot of Paris, believing that a favorable decision on the part of that distinguished diagnostician and eminent author would warrant him in revising his work, and putting it into permanent and accessible form. Through the kindness of a mutual friend, Dr. H. B. Millard of New York, this purpose was accomplished.

After promise of a careful perusal, Professor Charcot addressed to Dr. Millard the following letter, under date of January 5th, 1881 :

17 Quai Malaquais.

Très honoré confrère :

J'ai pris connaissance du mémoire du Dr. Searle. Je vois, en effet, l'affection nouvelle. Je ne l'ai du moins pas

rencontré avec les caractères tracés par le Dr. SEARLE, soit dans les livres, soit dans ma pratique.

Votre dévoué,

CHARCOT.

[*Translation.*]

I have made myself acquainted with the essay of Dr. SEARLE. I perceive, indeed, the new affection. At least, I have not met with it, accompanied by the characteristics described by Dr. SEARLE, either in books or in my practice.

With this indorsement, my *brochure* is commended to the public, in the hope that it will not fail to be useful to both practitioner and patient.

The accompanying essay on COCA was read before the Medico-Chirurgical Society, and is believed by the author to be the most complete and accurate account of that plant yet presented to the public.

W. S. SEARLE.

132 Henry Street, Brooklyn, N. Y.

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A NEW FORM OF NERVOUS DISEASE.

WITHIN the past seven years the writer has met with a number of cases of nervous disease which he has been unable to classify. Detailing these to his colleagues, he has learned that many of them have seen instances of similar disorder; and, finding no description of such a malady in the works of those ancient or modern authors which are accessible to him, he attempts it here.

In default of definite pathological knowledge of its nature or exact seat, the author is unable to frame an appropriate title for this malady, and so, for the present terms it simply a New Form of Nervous Disease.

It is characterized by two principal phenomena, one or both of which are always present in any case, and both of which are sure to occur sooner or later, if the disease is not cured.

One of these phenomena is a sensation of sudden *shock* or *blow* or *explosion* in some part of the head. This is usually located in the occipital region, and is sometimes preceded by something similar to the aura of epilepsy. In many instances, however, no aura is experienced. The shock may also be located in other parts of the head. It is, almost

uniformly, accompanied by *intense vertigo*. The other distinctive phenomenon is a condition of passive congestion, usually of the cerebellum only, but sometimes extending, on the one side, to the cerebrum and, on the other, to the upper portion of the spinal cord.

The shock is always followed and sometimes preceded by the congestion, but the latter is always aggravated by the occurrence of shock. The congestion is very protracted. It may precede the occurrence of shock for a year or more, and it often fills the entire interval between the shocks, but it is, usually, the first of the two phenomena to disappear in the progress of cure. Not seldom it is the sole symptom, shock never being developed.

Negatively, this disease is characterized by the absence of convulsions of any kind. There is no frothing at the mouth ; no biting of the tongue ; no pallor followed by flushing or lividity of the face ; no enlargement of the pupils ; no drowsiness nor mania follows the attacks ; and, although the shock may be so severe as to cause the patient to fall, it very rarely produces a loss of consciousness. On the contrary, when the shocks occur during sleep, as they are very prone to do, the patient is roused from the deepest slumber to instant and vivid consciousness, and must court and woo renewed oblivion as if he had not been in that condition at all.

So far as the writer is aware, this is a new disease—new both in the sense of recent origin, and

in that it has never been described. This, however, is a proposition which may be questioned both as a matter of fact and of theory.

As to the fact, he would be obliged to any one who will point out his error.

As a matter of theory, it may, perhaps, not be profitless if we pause here to briefly discuss the question whether there is any such thing as a new disease.

"The wise man" said, "there is nothing new under the sun." The thing that is, has been.

This will do as an aphorism—a general conclusion, but, specifically, its falsity is apparent. For, in this instance, it cannot for a moment be believed that all the woes and pains which to-day afflict humanity, were emptied like a flood upon Adam or Noah and their immediate descendants, nor (accepting the multiple origin of man) upon any of our progenitors. Surely, every disease must have had its beginning, so that, counting probabilities only, it seems quite likely that new forms of disease may, from time to time, appear.

I think this can be shown to be true even of acute disease. And, though a full discussion of that branch of the subject would be foreign to our present purpose, it may be remarked, *en passant*, that some basis for such an opinion can be gathered from the undoubted fact that whenever large masses of men have been herded together for a sufficient time, as in pilgrimages, fairs, prisons, etc., epidemic forms of disease have been sure to occur. And it is to be noted that, while such epi-

demics at the present day, may, with a little elasticity, perhaps, be included within settled nosological boundaries, yet variation from typical forms is often so marked as to render classification matter for hesitation and doubt.

It is currently believed that cholera originated from the pilgrimages in India, and other diseases have been only a little less clearly traced to their beginnings among men.

Those American physicians who recall their experience with fevers contracted by visitors to the Exposition in Philadelphia, cannot fail to remember how very embarrassing was the question of their nosology. In fact, so universally was this felt, that many abandoned all attempts at classification, and called the prevailing disease "the Centennial fever."

When we reflect that a similar variation in the types of acute disease is the rule and not the exception; that nosological lines are arbitrary, and drawn for convenience; that frequently the shadings between groups or single diseases are so gradual as practically to obscure or wholly blot out all boundaries, it cannot be matter for surprise (whether it can be proven or not) that many find ground for the belief that new forms of even acute disease may and do occur. There is, at least, one inconstant factor in the problem, viz., man, who varies as his environment varies, and whose conditions, in civilized life and in this age of rapid changes, are anything but permanent.

In confirmation of this view, we may remark

that the descriptions of acute diseases recorded by ancient or even comparatively modern masters of our art can, in some instances, with difficulty be made to fit the types of the same diseases occurring in our midst to-day. Who of us now sees the typhoid of Louis or the scarlet fever of Sydenham? Even if we accept the current theory of zymotic disease, and could prove that germs are incapable of spontaneous generation, variation, or extinction, the changes constantly happening in the conditions of human life, and their well known effects in modifying the organism, render it, not only possible, but probable that the forms of old, recognized classes of disease—even zymotic disease—may so vary as to render them virtually new, or even sometimes to produce entirely new maladies.

When we extend our view beyond the fields where germs are recognized as etiological factors, the probabilities grow stronger—strongest of all when we consider chronic disease, for here the factors are still more variable.

The "*omnis cellula e cellulâ*" of Virchow has become an aphorism. But a still broader proposition may be maintained, viz., *omnis cellula e simili cellulâ*—every cell is produced by a progenitor similar to itself in form, constituents and vitality. And the degree of similarity varies as the environment of cell-life varies. Not more certainly does a child resemble some one of its ancestors in face and form—in mental and moral peculiarities and tendencies, as well as in general vitality—than does

each cell its parent. Indeed the latter fact includes and postulates the former. And, as environment is undoubtedly capable of modifying the entire individual, so also must it modify cell-life.

What may be called the doctrine of habit in disease is by no means fully comprehended. It is a trite remark that we are "creatures of habit," but it does not seem to be appreciated that, not only is every individual organ in the body susceptible of habits of its own, but that the same may and must be predicated of the cells which compose these organs; and these habits, as the very word implies, are capable of variation and of education.

In the whole range of functional disease this law of habit is far-reaching, both in extent and in its consequences, and, when appreciated, has a wide bearing on the treatment of such disorders. But of this at another time.

We are now concerned with the operation of this law as it relates to cell-life, and through it, to organic disease. That it has a decided influence here cannot for a moment be doubted. The habitual use of opium alters the vitality, if not the constituents, of every cell in the body, thus furnishing a reason why the eradication of the habit and its consequences is so difficult. The same is true of arsenic, and, measurably, of tobacco, tea, and other substances. In this way only can the heredity of drunkenness, insanity, cancer, and a multitude of other diseases be rationally ex-

plained. The cure of a large number of chronic maladies by radical changes in climate and employment points in the same direction, and affords a clue to rational and efficient treatment.

This principle lies at the base of the efficacy of vaccination, and, if I mistake not, of the origin of venereal and other forms of disease.

The cell-life of every person differs from that of his neighbor, and, if brought within a certain range, will modify it. Not only is this true, but, while contact with a single individual may not cause variation wide enough to constitute disease (though even this is not uncommon), contact with a multitude of even fairly healthy persons, in succession, is often productive of very virulent disorders. Nor is actual contact of individuals necessary. Sleeping in beds or on furniture where others have rested, and left effete cells from the surface or other parts of their bodies—breathing the same air—eating and drinking with utensils used by them, etc., is sometimes quite sufficient. And thus every man's cell-life may become either sanative or poisonous to his intimate.

There was sound philosophy in searching for a vigorous maiden to lie in the arms of old King David, and thus prolong his precious life at her expense: there is more than mere superstition in the idea that the delicate and weakly may imbibe strength and vitality from rubbing at the hands of a vigorous man or woman: there is truth in the notion that a healthy child or even adult may become infected by sleeping with a consumptive: it

is true that wherever large masses of men are so collected together that the individual is exposed to contact with the many, there disease will originate, and, often, disease in new and peculiar forms.

If it be said that only effete and decaying cells are thus productive of disease, such an assumption simply goes to prove that the vitality of one cell affects another—the very proposition we are maintaining. And we may pertinently demand of the objector why the effete cells of a man's body are poisonous to others only and not to himself. One's own dirt never hurts him : it is only the filth of others that breeds disease in us.

I firmly believe that the contact of even normal vitalities tends to assimilate each to the other. Husband and wife thus tend to approach a common life, not only in mind and morals, but in physique. To this numerous facts testify, a few of which will suffice.

According to Dr. Ogilvie, a woman of Aberdeen had married twice, and borne children both times. All of them were scrofulous, as her first husband had been, although both she and her second husband were perfectly free from that taint.

Dr. Nott gives instances of negro women who, after having borne children for a white man, continued to have mulatto children by a negro husband. According to Dr. Simpson of Edinburgh, a young woman born of white parents, and who had a mulatto half-brother born before marriage, had undoubted traces of black blood.

Dr. Dyce says, he knew a half-caste woman who had fair children by a European, and who, on being afterward married to a mulatto, gave birth to children resembling her first husband in features and complexion.

Similar facts respecting the breeding of animals are well known to all naturalists.

Whether we suppose, in explanation of these occurrences, an impression made upon the generative organs only, or whether such impression or change extend to the entire body, the theory here advanced is equally confirmed.

Certainly the blood of a syphilized person brought into contact with the absorbents of a healthy man, never-so briefly, never so slightly, is competent so to change the cell-life of the latter that he shall feel it in every tissue of his body till his life's end. Why? Surely, no well-informed person would claim that microscope, or spectroscope, or test tube, or other artificial appliance has ever been able to show the presence or active agency of any foreign matter or virus here. No. It is simply and only the modification of normal cell-life by the contact of a cell-life which is different in its vitality—diseased. I am aware that it is mere theory, but, in the light of known facts, I feel confident that, if healthy women were subjected to the embraces of a series of ordinarily healthy men for years in succession, the cell-life of both sexes would, in time, be so modified that, had syphilis been blotted out of the world, it would again make its appearance.

If then cell-life is thus subject to the law of habit; if it be capable of modification by the voluntary or involuntary habits of each individual, and tends to propagate itself as thus modified; if also new modes of life and changing habits are constantly altering the environment of our bodies, surely there is foundation for the belief that new forms of chronic disease, at least, may arise. So that our answer to the query whether there be any such thing as a new disease ought to be, not "affirmatively proven," but "highly probable."

Without farther preliminary remarks I proceed to the detail of instances of the new affection.

NARRATIVE OF CASES.

CASE I.—Mr. A. æt. 47. Father dead at sixty-eight years of age; mother living at eighty. No hereditary tendency to nervous disease except that the father once had *angina pectoris* in a mild form. The patient is a physician, of rather lymphatic temperament, who, though often ailing, has never had a serious sickness of any kind.

The disease first made its appearance in September, 1874, after a vacation of a month which had been spent at a watering place. During August his health had been unusually good, but exercise had been limited, and food of a richer quality than usual had been indulged in. On September 1st he reached home, and, after a light supper, retired. About daylight on the following

morning he was aroused from profound sleep by a sudden shock in the occiput, accompanied and followed by vertigo, which was very severe. He sprang up and fell over upon the bed, not losing consciousness, however. Again lying down, after perhaps ten minutes, he succeeded in falling asleep, only to be once more wakened by a similar shock. This experience repeated itself five or six times before rising for the day, and it was then found that a sense of great weight, dullness and confusion oppressed the head, especially in the occipital region. The hands and feet were inclined to be cold and the head was hot. The cerebrum also seemed somewhat involved, as the whole head felt badly, and the conjunctivæ were suffused.

The ingestion of food, at this and all subsequent times, afforded temporary relief from the pressure, fullness, constriction, and dull, leaden weight in the occiput. With the return of night, there was a disposition to elevate the head more than usual. By morning the symptoms had disappeared from every part of the head except the occiput, and there was no recurrence of shock at that time; but the other symptoms mentioned persisted in the occiput without much intermission, though with variable severity, for several years. Shock did, however, return at irregular intervals, occurring only when upon the point of falling asleep or during the early morning hours, and it seemed most likely to come when lying upon the back. The shocks were, in this case,

always preceded by a kind of aura, which began somewhere in the spine, and, if the patient could wake soon enough to exert his will, it appeared to him as if the shock was thus prevented or lessened in severity.

With occasional intervals of a few days or weeks, when the entire trouble seemed to vanish, the above symptoms continued for over three years, while his general health, on the whole, appeared to be better than before. During a small portion of this time, when overworked, it became so troublesome as to prohibit writing. Reading was never difficult, and indeed, was usually a relief. During one of these periods of intense aggravation the opthalmoscope showed a slight hyperæmia of the retina, but, for the most part, no disturbance of the functions of the brain nor congestion of the retina could be detected.

The recurrence of shock, and of the sensations in the occiput which invariably followed them, seemed sometimes to be excited by derangements of digestion, but more especially by anger. Other emotions, when profound, were quite as likely to afford relief as the contrary.

On the whole the shocks were infrequent, often not occurring for months—the exciting causes serving only to produce congestion in the cerebellum.

Alleviation, temporary but complete, was always obtained by eating or by drinking wine or beer, and by active exercise. During the whole history, the usual good functional condition was

maintained. The bowels were regular, the appetite good and digestion was performed commonly well. Sexual intercourse had little or no effect. As a rule, it appeared to be beneficial. Real vertigo was felt only with the shock, but sudden motion or sudden cessation from it, as in the starting and stopping of cars, or their rapid swinging around curves, or the rise and fall of a boat upon waves, gave an unpleasant, unstable sensation in the occiput as if vertigo were impending.

This patient regularly smoked about six cigars daily. At one time, for a short period, they were omitted, but were resumed on account of indigestion, which was sure to come without their use after meals, and which they as surely prevented. Aside from this they seemed to have no effect. The patient had used tobacco in this form and for this purpose for many years.

This case, while on the whole steadily improving, cannot yet, at the end of over six and one half years, be said to be entirely well. So long a period as six months will pass without recurrence of shock or the presence of congestion, and then the excitement of travel or the pressure of his exacting profession, with its profound excitements, will bring about an attack. These occurrences, however, seem more and more rare and brief. The old occipital distress has departed entirely, and has not been experienced for two years past. In spite of the duration of this complaint, and its great severity at its onset, the general health is now better than ever in his life

before, and no mental faculty has suffered any deterioration.

CASE II.—Mr. B., æt. 50, is the brother of the first-named gentleman. He is a manufacturer, of unexceptionable habits, and is married. He has always had a delicate stomach, and this disease seemed to make its *début* in that organ, in the form of sharp attacks of gastrodynia, during the summer of 1874. These attacks were not induced by errors in diet; were very severe, and accompanied by vertigo, vomiting, and cold sweat. Recurrences came with intervals of months but with increasing frequency.

Until about July, 1876, he had only his usual occasional headaches, which apparently arose from indigestion. But near that date, while engaged in light exercise in the open air, he experienced a shock, like a sudden blow upon the occiput, with vertigo, which instantly felled him to the ground. He was not unconscious during this nor any subsequent attack, and had no other epileptiform symptom. This shock was followed at once and persistently by a sense of weight and fullness in the occiput. Similar explosions, and occasional returns of the gastrodynia followed through the summer. The latter attacks lasted from one to three hours, and, with the usual distress in the stomach, flatulence, etc.; severe vertigo was always present, and prostration was extreme. The vertigo was of a peculiar character. Upon turning the head to one side, all objects seemed to

be rushing past him in the contrary direction. The eyeballs were afflicted by nystagmus, and the patient closely approached collapse. In the intervals the occipital symptoms were intense, and sudden motion of any kind threatened such imminent return of the vertigo that the head was rigidly held in a bent-forward position almost constantly. Considerable dull pain was felt in the nape of the neck and between the shoulders. From insufficient control of the recti muscles, the eyes were always unstable, so that reading, except for brief intervals, and writing at all times, became impossible. No hyperæmia of the retina was ever found, though it was carefully looked for on several occasions when, if ever, it should have been present. Respiration was rapid, and became panting upon slight exertion. The power of co-ordination in the lower extremities was decidedly affected. The gait was straddling and shuffling, and a cane was necessary. Sleep was good, and only excessive from lack of other employment. The hands and feet were cold, and a desire to lie with the head much elevated was marked. With all these distressing symptoms, the mind did not seem at all impaired. Often, when feeling very badly, a game of whist was played, and well played. No mental faculty in this patient has at any time shown signs of failure. The sexual organs were not disturbed, nor could the patient distinguish any change in their functions nor any connection between the exercise of them and the phenomena of the disease. The

bowels were regular, and the excretions from the kidneys unaffected except when bilious complications occured. Under treatment the violence of the symptoms abated, so that, by the fall of 1876 he was much better. From neglect of his own, a relapse took place in the winter, which, however, was soon brought under control. The succeeding summer was spent in the Adirondack woods with great benefit. But the return of winter brought another brief relapse. By spring great improvement was again manifest. The summer of 1878 was again passed in the forest, and in comparative comfort, until, toward the close of August, he awoke, and found his left arm paralyzed. Both sensation and motion were impaired, but the former not wholly lost. Electrical examination proved this to be peripheral in character, and under this variety of treatment at the hands of Dr. John Butler, of New York City, together with careful prescription at the hands of Dr. H. B. Millard, of the same city, the arm fully regained its pristine vigor. By January, 1880, his health seemed nearly re-established. Co-ordination was perfect; useful vision was restored; the attacks of shock, and gastrodynia were rare and mild, and he returned to business.

CASE III.—Mrs. C., a dressmaker, æt. 42, enjoyed good health until about two years ago, when she began to suffer somewhat from headache. One year since, her husband died, and she was much exhausted by nursing him. She then expe-

rienced an increase of headache, which located itself in the occiput. It was a cold sensation, as if a piece of ice were in the cerebellum. About this time disturbances of vision began to manifest themselves. She noticed a red halo around the gaslight, which would change to yellow, and then disappear. Reflected light seemed to be composed of red or purple rays. On first opening the eyes in the morning all objects appeared red—the color slowly fading away. When walking in the street at night, the light seemed to stream from the gas posts in rays which appeared so solid that she felt impelled to step over them.

Nine months ago she had occasional diplopia, and, at times, was so amblyopic that she could not see persons sitting at the opposite side of the table. She is now emmetropic with V. $\frac{20}{20}$ on each side. Nothing abnormal can be discerned in the *fundi oculorum*, although many of the above subjective symptoms still persist.

The first shock occurred six months ago. Since then she has had them nearly every week. More commonly she experiences a sensation as of a thread breaking or a bubble bursting in the occiput. She sleeps heavily, but when wakened it is difficult to get to sleep again. The sense of hearing is hyperacute, and illusions of vision, such as spectres of animals, are not uncommon.

In May, 1878 (about a year after the first occipital symptoms), while feeling uncommonly well, she had a severe shock in the occiput which caused her to fall. She became unconscious, and

remained so for about an hour. There was no outcry, no convulsion, no frothing; and no drowsiness followed. The face was pale throughout, and the pupils unaffected. After this attack the occipital sensations were much worse, and the entire head felt badly. The hands and feet were cold and she could not lie down. After five days came another shock, even more severe. She was attacked in the street and was brought home, wandering in talk, with flushed face, wild eyes and coughing violently. She was delirious for some hours. In neither attack was there any stertorous breathing. Similar shocks recurred, for a time, at intervals of about a week, but none of them were so severe as those here recorded.

On several occasions I carefully examined the eyes of this lady, but was never able to detect retinal congestion. All the shocks were accompanied by a thrill which spread like a flash from the occiput to every extremity, and was associated with vertigo. Aside from this, vertigo was slight. The bowels were regular, the appetite and digestion good, and the menstrual function regular.

This patient was under the care of the writer for some months, and since that time under that of another physician. I have seen her as late as December, 1880, and she says that she has nearly recovered her former good health: has only slight, occasional, unpleasant reminders of her former disease.

CASE IV.—Mrs. D., æt. 21, is a married woman of English birth. Her parents are living and in good health. About January, 1877, three months after the birth of her only child, she was attacked by sudden shocks in the head. They were first felt in the vertex. She describes them as like a quick contraction of the brain from the eyes to the top of the head. For the first two months she had no vertigo, but, since the shocks have located themselves in the occiput, it has become a very prominent feature. She now complains of explosions in the occiput. These are preceded by a thrill which begins in the spine or in one foot, spreading rapidly to the back of the head, and ending in a crash as if that part of the skull had been blown off. At times she falls, but is never unconscious, nor convulsed, does not froth at the mouth nor become drowsy. On the contrary she is frightened and trembling with cold perspiration. The shock is always accompanied by vertigo, and this is now almost constant. When walking, it seems as if the pavement rose to meet the foot. When in bed, the couch seems to rock, like a boat upon waves. There is a confused feeling in the occiput, and reading is impossible, but no mental faculty is obscured. Vision is indistinct—objects being seen as through a mist, and the eyes ache when used. She is emmetropic, and the retina looks anæmic, as does the entire body, but otherwise the *fundus* is normal. Sleep is not good. She is poor, and cannot obtain proper food. The bowels are regular, appetite good, and the menses

normal. All her symptoms are temporarily relieved by eating and stimulants.

CASE V.—E., æt. 19, is an unmarried German house-servant. She is very robust-looking. Indeed, she is the very picture of health. Three years ago she had typhoid fever, and has since suffered more or less from ordinary headache. About one year ago she began to experience sudden shocks in the occiput with vertigo. The sensation is not preceded by an aura, and is like a sudden blow upon that part of the head. These sometimes occur in the forenoon, more often in the afternoon, but most frequently after going to bed. Often they arouse her from sleep, causing her to spring up with fright, and are accompanied by a thrust as from a knife through the occiput from side to side. They are followed by an exacerbation of the sense of fullness and weight which is constant in the back of the head, and which is also made worse by lying down. The extremities are very cold. Latterly, shocks have recurred frequently, several coming within a week. Each paroxysm includes several shocks, repeated at brief intervals, and sometimes extending over an hour. During them she is obliged to keep the head bent forward and immovable to prevent their return. She has never fallen, but feels sure she would if she could not grasp some firm object. She has never lost consciousness, nor had any other epileptic symptom. After the shocks have ceased vertigo often continues for

hours, and is palliated by closing the eyes; stooping or lying down at once increases the fullness in the occiput, while soaking the feet in hot water diminishes it. All the other functions of the body are in a perfectly normal condition.

CASE VI.—Mr. F., æt. 24. Parents living, as well as three brothers and sisters; all in good health. No nervous disease in the family, except that the maternal grandfather died insane. This disease began in the spring of 1879, during the excitement of business trouble. The patient first experienced pressure in the occiput, which was always relieved by eating and stimulus. He was sleepless and nervous, and perspired easily. Is unmarried, and from the inception of the malady till now he has experienced a terrible and unwonted amativeness. He has amorous dreams, and, about once a week, a noctural emission, after which his head feels decidedly relieved. Up to the date of this disease he never had an emission of semen. About three months after the development of the congestion, he began to have explosions, apparently in the ears, which were followed by an increase of occipital distress. At times the head remains clear for a week or two, when a shock will occur, and the resulting fullness in the occiput persists for several days. These attacks are diurnal only. They begin by a warm sensation at the lower extremity of the spine, which slowly creeps up to the occiput, and there ends in an explosion, which is followed by cold perspira-

tion, buzzing in the ears, and weakness. He has never lost consciousness in the slightest degree, nor had any other epileptic symptom. Attacks are precipitated by mental excitement, but by anger most of all. The hands and feet are cold even in warm weather, but he has no desire to elevate the head when lying down. He has more or less vertigo, which he refers to the forehead, with a tendency to fall to one side. For the past two months he has had a sensation as though he were treading upon cushions, but he exhibits no other ataxic symptom.

Lately, lights appear blurred to him. There is slight venous congestion of the retina, but the disks look normal. He also experiences flashes of light, and transparent whorls, which appear and float slowly away. His bowels are regular and his appetite good. He sleeps heavily and wakes unrefreshed. His stomach, always weak, now seems weaker than ever, and food will not digest unless he smokes tobacco.

CASE VII.—Mrs. G. is a married lady of about forty years. She is very robust looking and well nourished. In fact, to all outward seeming, she is in blooming health. When thirty-three years of age she had a severe illness while pregnant, and artificial labor was induced. Seven weeks after confinement, after she began to consider herself well, she felt the first faint thrills which have since developed into the severer form of shocks. They then lasted only one or two seconds, and the sen-

sation was that of being suddenly grasped in the neck at its junction with the cranium, with sufficient force to produce a feeling of numbness, which was followed by a "black wave" over the brain. Succeeding this came a sensation as though the inside of the skull were hot and crackling—becoming almost calcined.

During five or six years she was earnestly engaged in public charities, and ordinary family cares, and, in spite of intervals of summer rest, some of which were spent in the Adirondack forest, the disease increased. In the spring of 1877 it became much aggravated, and this, in spite of improvement in general health. The shocks increased in number and severity. Often they recurred very frequently for two or three days at a time, always producing or aggravating the sensation of "numbness" in the occiput. They bore no relation to the period of waking or sleeping nor to the menstrual function. In the spring of 1879 she reported "the shocks are now milder, but the numb spot has spread till it extends from the vertex to the lower end of the scapula." The shocks in this case appeared to originate at the upper part of the spine, and to involve the whole cerebrum. They were accompanied by nausea. At times they caused the patient to fall, but she never lost consciousness nor manifested any epileptic phenomena. The hands and feet were constantly cold, and she was obliged to elevate the head very much when lying down. The sensation of numbness was palliated by eating and by the application

of cold to the head. No mental faculty has been impaired, and all the functions of the various organs are performed regularly. The patient declares herself unable, after years of anxious thought, to fix upon any time or cause as likely to produce or increase the shocks.

Her pulse is usually rather weak and sluggish, but during and after the shocks it is greatly accelerated.

CASE VIII.—H. is a stalwart laboring man of Irish descent, æt. 63. He is ruddy and well nourished, and quite above most of his class in intelligence. His father was a surgeon in the English navy, and he has followed the sea most of his life, but is now a longshoreman. He looks very powerful, and says he can readily lift three hundred pounds. Is a total abstainer from all spirituous liquors and chews tobacco very sparingly. Two years ago while in usual good health, and without known cause, he began to experience a dull, full feeling in the occiput with occasional vertigo. It was always aggravated by lying down. Often the only possible position in the bed was upon the face. His feet have been very cold, especially when the head felt most badly. Has always been better after eating. About five months ago he had his first shock. It was so sudden and unexpected that he supposed he had been struck by some one, and, on turning and finding a stranger behind him, he at once knocked him down. The misunderstanding was soon settled, and he became

satisfied that no one had attacked him. About ten minutes later he became giddy and fell. He did not lose consciousness, but the occipital distress was increased to a marked degree. He has since had about a dozen of these shocks, similar in all respects and varying only in severity. He has no epileptic symptom of any sort: neither memory nor any other mental faculty has failed. The congestion of the cerebellum is intense in this case. For months past he has been obliged to sleep sitting up with his head bent forward on his arm, and has often walked the floor all night unable to rest in any position. He complains of blurred vision and flashes of light. He is hyperopic $\frac{1}{18}$, but no hyperæmia of the retina can be discovered. He says that his sexual functions are perfect and unchanged, and he can discern no relation between them and the phenomena of the disease. He has no ataxic symptoms, but is often so giddy that he staggers in the street like a drunken man. The shocks in this case have not been preceded by an aura and have always occurred in the day time.

CASE IX.— Mr. I., æt. 50, a physician, has the appearance of fair health. When a child he had chorea, as did some of his brothers. When six years old he suffered from a white swelling of the knee. At eleven he had some functional disease of the spine. At seventeen had some months of inflammatory rheumatism, recovering without damage to the heart. At twenty-one he had intermittent fever severely. After restoration from

this, he enjoyed ten or twelve years of tolerable health, but frequently suffered from vertigo, especially when exposed to the rays of the sun. Then, for the first time, after overwork, he experienced shocks going up the spine, with pallor and cold sweat. These attacks lasted but a few moments, and there was never loss of consciousness. At the breaking out of the war, in 1861, he enlisted in the infantry, and, though much exposed, gained in flesh and general health, until attacked by malarial fever in the Chickahominy swamps. He, however, kept on his feet. One day, while being shaved, he had a sudden attack of vertigo, and was, for a few moments, unconscious. No other epileptic symptom was observed, however. He was soon afterward discharged from the army. In July of the following year he was again ill, and was confined to bed several months. During the last ten days of this sickness he had about fifty tonic spasms, resembling tetanus. These were preceded by violent vomiting, and began in the extremities like an aura (a sensation as though cold air were blowing on the fingers and toes), and then crept up the body. The fingers became contracted and the arms flexed: the rest of the body rigid and cold. There was no loss of sensation in the limbs: the pupils were dilated; but no loss of consciousness. There was great loquacity, until, in turn, the jaw and tongue became stiff. During this illness he had severe jaundice. The spasms ceased under the use of Belladonna^{200}, although up to the time of its exhibition they were becom-

ing more frequent and severe, and they have never returned. For three years succeeding this illness he suffered from shocks in the occiput, which seemed to originate between the shoulders, and were accompanied by a sensation as if various parts of the body were "going to sleep." After 1865 he seemed to recover his health, gained much in flesh, and did an immense amount of physical and mental labor. In 1876, while making some remarks in public, and under considerable excitement, he suddenly "felt as if struck by a meal-bag" upon the occiput. This was followed by a dull distress or fullness there which has continued nearly ever since. During 1877-8 he had repeated attacks of vertigo, especially after exposure to the sun, and has occasionally experienced shocks, preceded by an aura, but with full consciousness. On the morning of June 18th, 1879, after a quiet night's rest, he awoke, lying upon his back, and found objects whirling and dancing about him. Soon he became cold and sweaty. His face assumed an ashy hue, and a numbness crept over the entire body. The arms were slightly convulsed. Nausea and vomiting followed. He had for some time previously been overworked, and exposed to the sun: had been eating heartily; and had just recovered from a severe attack of acute jaundice. He had also experienced for some weeks a peculiar sensitiveness of the skin—a touch upon the hand producing a jar in the arm even to the shoulder. In about two hours the nausea ceased, but the least movement of the head

brought a return of the vertigo. He walked feebly and staggered like one drunk, while the head felt large and either too light or too heavy. Like Case II., on turning toward the right side, all objects seemed flowing past him in the opposite direction at a rapid rate.

Gradually these symptoms subsided, until in October, 1879, when he came under the writer's notice, his condition was as follows :

Florid complexion, slightly tinged with yellow : conjunctivæ jaundiced : tongue slightly coated : breath exceedingly offensive : appetite good : stools regular and normal : sleep good : inability to look up long at a time or lie upon the back or right side because of a sensation as if a globe of air would rise into the head, and produce a sore sensation in the brain, with vertigo : an uncertain feeling in the head when fatigued : can walk and turn better when the eyes are closed : less distress in the occiput than formerly : occasional numbness in the left arm. When an attack seems impending a sudden motion of the body will prevent it. No mental faculty has been impaired by his many sicknesses and sufferings.

CASE X.—Mr. J., æt. 30, is married. Up to October, 1879, he was perfectly well. He is robust and very athletic. On that date, having attended to business as usual and eaten a light supper, he was engaged, about eleven P.M., in stooping over and opening a box, when he suddenly felt a kind of faintness or nausea—a peculiar and entirely un-

usual sensation. On rising he became very giddy, and his head felt very badly. In a few moments he seemed better, but suddenly there came what he himself entitled a "shock" in the head which caused him to drop upon his knees. It was an indescribable sensation, affecting the whole head. He started for a window in great alarm, but fell upon his knees twice before he could reach it—each time experiencing a repetition of the shock. He did not lose consciousness, but was terribly frightened and thought he was going to die. For the most of the time since that occurrence, his head has felt badly, particularly on the vertex, where he complains of heat and pressure, which sensations seem somehow to extend to the stomach and cause nausea. His feet are unusually cold, and he has flashes of light before the eyes. Vision is not impaired, nor can any change be discovered in the retinal veins. He lies down and sleeps as usual except that he feels uncomfortable upon his back. He has an uncertain feeling in the head, as though at any moment he might be dizzy or have another shock. This is increased by the stopping and starting of cars, elevators, etc. Eating and stimulants always relieve it. Often when apparently on the verge of an attack, if he starts up and walks, it is averted. When he first begins to walk he staggers. He has once experienced a very distressing sensation as though an iron band was around his waist. This also was dissipated by stimulus. He can read without difficulty, but sometimes has trouble in writing. Indeed, he seems to have had

something of the agraphic form of aphasia, as he often omits words when writing. On one occasion he had to rewrite a telegram a dozen times before he could get in three consecutive words which he determined every time to include. All his bodily functions are in perfect order.

In December, 1879, he had a second severe attack. He was walking out after supper, and was suddenly seized with a "tight" sensation in the chest, as if choking. Then came a feeling as if his brain were grasped in the region of the vertex. He fell to his knees, retaining perfect consciousness. The paroxysm passed without recurrence of shock. In neither attack were any epileptic symptoms present. There is no nervous disease in the family. He has been a great smoker, but since the inception of this disease he has quitted that habit entirely, without relief or change in his present symptoms.

CASE XI.—Miss K., æt. 18, has always been well, except that she has lost her vision from keratitis ulcerosa, and resulting central leucoma. Three weeks ago, about midnight, she was wakened from sound sleep by a sensation like a blow on the occiput, with vertigo, and was afterward unable to lie down for fear that it would return, and because it gave her a pain like a knife passing through the occiput from side to side. The next day she could hardly walk because of vertigo. The head, especially the occiput, has felt confused, dull, and heavy ever since. Every

night at about twelve o'clock she gets a similar shock. Up to that hour she can lie down, but only upon the right side. After the shock she must sit up till daylight. All bodily functions are perfect, and she knows of no cause for the disease, hereditary or otherwise.

CASE XII.—Mr. L., æt. 33, is a bookkeeper and unmarried. Father died of pneumonia and mother of yellow fever. No brothers or sisters. No nervous disease in the family. Is tall and powerfully built: ruddy and well nourished. Has never been sick enough to stay in bed since childhood. First had trouble with his head about ten years ago. It was a dull distress in the occiput with great nervousness and melancholia. He thought he was going to be insane. Has always been continent, except that when a boy he fell, for a very short time, into the habit of onanism. About four years ago he had his first shock. It seemed to be in the centre of the brain, and was like the explosion of a Leyden jar. All others since have been of the same character, and have uniformly been followed by a sensation of "nerve agony" which spreads from the head through the spine and arms. With the explosions there is a sensation of a wave or flush in the whole head followed by extreme nervous exhaustion. There is no vertigo with the shocks. The bad feelings in his head are mitigated by eating and by stimulus, and are aggravated by emotions of all sorts, and by sudden surprises. He has not had cold feet nor trouble

in lying down. General functional condition is perfect. Has never used tobacco, tea, or coffee. Has never at any time lost consciousness nor had any epileptic symptom.

CASE XIII.—Miss M., æt. 11, has had attacks of vertigo for about two years. She is a fine, healthy-looking little girl, of modest but fearless demeanor. These attacks have come upon her suddenly, often in the street. She would stand still, cry out for help in a frightened manner, and say she was dizzy. During this time her hands and feet have been cold, and she has had to sleep with her head much elevated. Her head has felt dull and muddled during most of the time, and it has been much worse after the attacks of vertigo. It has usually felt better after a repast. She has never lost consciousness nor had any epileptic symptom. Has vertigo in a minor degree most of the time. She says it seems as if the pavement or floor rose to meet her feet as she walks.

Since four weeks she has had four attacks just as she was falling asleep. These wake her to vivid consciousness, and she screams and cries and breaks out into profuse cold perspiration. Says that she feels as if an explosion had occurred in her head, but cannot locate it exactly. After her mother has calmed and quieted her she falls asleep again. Her bowels are regular and appetite good, but her stomach is often disordered. She has chorea of the face, but otherwise has not been a nervous child. The mother says she has never

had any of the epileptic symptoms which are carefully described to her. From the description of the mother I judge that the father and one of his brothers have had epilepsy.

CASE XIV.—Miss N., æt. 22, is of a nervous temperament, but no nervous disease belongs in the family history. About four years ago she began to be troubled with indigestion and constipation, and since that time has been debilitated, and at times has had severe headaches. She is a teacher by occupation, and, of course, much confined to the house. During the past five months she has not been free from a tight, full, numb feeling in the occiput, accompanied by a buzzing and throbbing in the ears, with a dizzy sensation, especially upon rising. She starts in her sleep and dreams much. On several occasions, when just falling asleep, she has been suddenly awakened by a shock like a pistol exploding in the occiput. When startled by a sudden noise she has a creeping sensation in the back of the head. The feet and hands have been uncommonly cold, and she has had to elevate the head when lying down, more than was formerly customary for her.

CASE XV.—(*Furnished by* DR. W. J. BANER, *of New York.*)—Mrs. O., age unknown, began to suffer from shocks in the head some time during the year 1873. She states that she cannot now recall distinctly all her symptoms. She never had more than ten or twelve shocks. They always

followed a day of overwork, mental or physical, and always occurred after retiring, when just losing herself in sleep. They consisted of a loud snap in the occiput, and would rouse her to full consciousness, with a shattered sensation in the head as if something had really exploded there. The head felt jarred for a few moments, and then all was right again. She knows of no cause except fatigue, and especially worry.

CASE XVI.—(*Furnished by* DR. H. B. MILLARD, *of New York.*)—Mr. P., a lawyer, after having been exhausted by hard work during the summer of 1876, was exposed to the sun at a period of intense heat. Partial syncope and great debility were the direct results. Soon afterward he began to experience frequent shocks in the occiput, which produced faintness and coldness of the extremities. They were followed by intense and painful fullness in the back of the head. He was quite dyspeptic, and was in the habit of indulging in incomplete sexual intercourse.

CASE XVII.—(*Also furnished by* DR. MILLARD.)—Mr. Q., a hotel clerk, æt. 35, had suffered for two months from shocks in the occiput, followed by congestion of the cerebellum. The attacks were attributed by Dr. Millard to excessive sexual intercourse.

CASE XVIII.—(*Also furnished by* DR. MILLARD.)—Mr. R., æt. 32, of slight form and nervous tem-

perament, was, until six years ago, addicted to onanism. Occasionally and without premonition, he suffers from a shock extending from the occiput to the end of the spine. He also has sudden attacks of vertigo followed by persistent congestion in the back of the head. In this region the scalp and muscles of the neck are sensitive to the touch.

This completes the list of all the fully developed cases of this peculiar disease of which I have notes. I have treated others, of which, unfortunately, I have preserved no record, and I have casually met with many who had suffered or were suffering from the same malady. In still other instances I have been consulted by patients who complained of the congestive symptoms only—the disease having, apparently, not progressed far enough for the development of shock. From the similarity of the symptoms complained of, from the presence of the same conditions of aggravation and alleviation, as well as from the fact that several of the more complete cases exhibited the same sensations for months and sometimes years before any shock occurred, I feel justified in regarding them as incipient forms of the disease under consideration.

I will here detail briefly but three of these cases.

CASE XIX.—Miss S., is a maiden lady, æt. 37. She enjoyed good health until the fall of 1876, when, after parting with some dear friends, she

experienced a sensation in the occiput which was entirely new to her. She describes it as a sense of fullness and pressure—a numb, wooden feeling. With seldom an interval of a few days, these symptoms persisted for two years. She never had a shock, but, on sudden emotion, a grasping sensation, as if a hand were squeezing the cerebellum, would be felt, and this would be followed by a decided increase of the customary occipital distress. The emotion of anger was especially effective in that way. On moving the head, the upper cervical vertebræ would creak like a rusty hinge (a symptom often mentioned by others also). With the advent of the disease came the necessity for having the head much elevated at night, and also unusual coldness of the extremities. Vertigo has only been occasional and slight. All the bodily and mental functions remained perfect throughout the course of the disorder. Several examinations were made with the ophthalmoscope, but retinal congestion was never found. Eating, or drinking wine or ale, always gave temporary relief.

CASE XX.—Miss T., æt. 24, unmarried. Has had distress in the occiput for about four years. It is a dull aching, which is relieved by eating and by stimulants. She has no vertigo. Vision is blurred at times when the head feels worst. Is otherwise healthy. Has never had shocks. The pressure in the occiput is increased by strong emotion. The hands and feet are cold, and she

desires to elevate the head when lying down more than when she is well: no retinal congestion.

CASE XXI.—Mr. X., æt. 32, unmarried. Is wealthy and a generous liver. Since six months he complains of a dull, disagreeable, full feeling in the occiput, which makes him desire to elevate his head when lying down. It is relieved by drinking wine, and made much worse by mental excitement, particularly by anger. Is otherwise perfectly well.

ETIOLOGY.

THE predisposing causes of this disease, like those of many chronic affections, are involved in much obscurity. In fact, very little is certainly known concerning the predisposing causes of most diseases. Far too many variable factors enter into problems of this sort to permit constant and positive conclusions.

Neurologists name heredity as one of the most certain sources of causative influence in their especial field, and in this they are doubtless correct. Little evidence of its power, however, is to be seen in the histories above given. Only in case XIII. is there any direct and unequivocal testimony. This instance will be more fully discussed hereafter. So far as the other cases are concerned, where it could be traced, no sign of adequate hereditary influence was found.

The old and well-known theory that the cerebellum is the nerve-centre of the sexual organs, together with the fact that some of the victims to this disease have confessed to irregular and improper use of these organs, have led some to believe that such aberrations were the efficient cause of the malady. To this theory the cases furnished by Dr. Millard, and the unwonted erethism of the sexual organs manifested by case VI., lend considerable countenance. So far as the last mentioned is concerned, however, it may be remarked that there are decided proofs, in the symptoms of this case, of functional change in the spinal cord, and therefore, the sexual erethism may have had its root in that organ. So far as Dr. Millard's cases are concerned, sexual abuse is simply assumed as the cause. It may have been, and probably was, *a* cause, but to say that it was the sole or even the main cause appears to me to be claiming too much. Especially is this so when we reflect that no charge of such causation can lie against the other eighteen cases reported. It is to be remarked also that no reputable physiologist of the present day is willing to affirm that the generative organs derive their nervous force from the cerebellum. This theory is opposed by too many insurmountable facts. Again, mankind long ago exhausted the possibilities of sexual abuse. How then can a new form of disease be consistently attributed to such a cause in men and women of, at least, ordinary continence? Still farther, if sexual abuse or irregularity were the efficient cause,

ought we not to have found some relation between the occurrence of the menses or sexual intercourse, and the development of shock? Assuredly. And yet in every case in which the question was asked, the patient clearly negatived that supposition. And, finally, if sexual abuse were even one of the causes of this disease, why is not the malady vastly more prevalent than it is?

To me some physicians seem to be possessed by what may be termed the *mania causationis*. Such philosophers find in vaccination the cause of every modern disease. Others, against the most overwhelming arguments, persist in attributing diphtheria to the influence of sewer gas. Others, again, meeting a few scattered cases of atrophy of the optic nerve, for the existence of which no more evident cause can be found, straightway label them "tobacco amaurosis." They forget that the annual consumption of "the weed," in some countries (Turkey for instance) rises to the enormous height of fourteen pounds for each man, woman, and child of the entire population, while ophthalmologists declare that amaurosis is an almost unheard-of disease in that country. Did tobacco cause amaurosis, every other male Turk, Malay, and Spaniard ought to have white atrophy of the optic nerve. So, too, with those who find the source of all evils in masturbation, sexual excess, incomplete sexual intercourse, etc. While I would not go so far as some distinguished authors have done, and affirm, with them, that no

greater evils result from onanism than from as frequent sexual intercourse: while I feel well assured that excess in any direction tends to break down nervous tone, and predispose to diseases of many varieties; still, I boldly assert that no one can justly place his finger upon any single disorder (unless it be spermatorrhœa), and say that sexual abuse is its cause. In the present instance, two facts are quite sufficient to convince any reasonable man that such aberrations are not the efficient cause of this disease, viz., its comparative rarity and recent appearance, and its development in many who are free from blame in this regard.

What, then, are the predisposing causes? I frankly confess that I do not know. But, since we have the testimony of so extensive an observer as Charcot that he has never seen an instance of it, and as I am not aware that any English or continental writer has ever described a case of the kind, I am inclined to consider it one of the results of American civilization, and to set it up as one of the many fingerposts, which are rapidly being erected here, pointing to the truth that we live too fast, in this country.

The simple fact is that our men of business and our professional men are working at a rate far beyond what is wholesome or prudent. I think I do not exaggerate when I say that even those of us who think we are living careful and not overhurried lives, are really going at a killing pace compared with our compeers in other countries. It is probable that our men of affairs, at least, accom-

plish as much in twenty-four hours as their peers, in England even, do in forty-eight, and, as compared with the same class in Germany, Italy, or many other countries, three times as much. Certainly it cannot be denied, and most impartial observers of our statistics affirm, that nervous diseases are rapidly increasing in number and variety in this land. And, if we are to look for a change in this respect, our habits of life must be greatly altered.

Still, this cause cannot be a direct one ; for the variety of age, sex, and occupation seen in the above record forbid any such deduction. It must be an outcome from very complex and far-reaching causes.

Among those already suffering with the malady the exciting causes of fresh attacks are various. Of these, indigestion is prominent. Mental anxiety and overwork may also be mentioned. But the emotion of anger seems to sustain a very peculiar relation to the attacks. In most instances, other emotions may be aroused with comparative impunity or even with temporary benefit, but that of anger is sure to precipitate a relapse. I cannot explain why this should be so.

ANALYSIS OF SYMPTOMS.

In considering the symptoms of the cases above recorded, two central phenomena at once arrest the attention. One is that of shock, and the other

apparently that of venous congestion. Either of these may antedate, and, perhaps, postulate the other. In Case I., the shock stood at the very threshold—bursting upon the patient without any previous congestion of the head. Others seem to have endured a variety of forms of headache, not clearly defined in nature, but did not complain of the peculiar occipital sensations until after shock had occurred. Others, again, suffered from congestion of the cerebellum for months and years before the development of shock.

The phenomenon of *shock* is a very curious, and, so far as I know, a unique one. Judging from the criticisms which have appeared since some of the above cases were first published, I am inclined to believe that its character has not been fully appreciated by the profession. Some, at least, have confounded the term *shock* with the very common starts or jerks which pass through the body as one is falling asleep, sometimes waking the patient and sometimes failing to do so. This is a grave error. What I mean by *shock* is a much more profound and serious symptom. Usually it gives the sufferer a conviction that instant death is impending, and it is quite sufficient to terrify the most phlegmatic of men. In the majority of cases it is referred to the occiput, and in such instances only it is accompanied by vertigo. When it is localized in the cerebrum or in the ears, vertigo, as a concomitant of the shock, is rarely or never mentioned. In Case IV., the shocks were first felt in the sinciput, and vertigo was not manifested until after their

locale had shifted to the occiput, when it became a very prominent and distressing feature of the case. Still a tendency to vertigo appears in all instances, even those in which shock was never developed. In one case only (XIV.), vertigo is not mentioned at all. But the patient distinctly states that she does not recall all of her symptoms, and the disease, in this instance, seems to have been cured before it reached full development.

The occurrence of shock appears to be somewhat under the control of the will. One patient says that, if he could wake soon enough, it seemed possible for him to prevent or mitigate the shock by his will. Two others state that, when shock was impending, sudden motion of the body—starting up and walking—apparently prevented its occurrence.

It is sometimes preceded by a kind of aura and sometimes not. This aura appears to resemble that of epilepsy, but the shock is very different from the corresponding phenomenon of that disease, as will be shown when we come to consider diagnosis. The prominence assumed by vertigo as a symptom when the shocks were localized in the occiput, and its comparative rarity and mildness when they occurred elsewhere, even in the ears, is very significant, and is quite in accord with the views of modern physiology as to one of the functions of the cerebellum : viz., that of co-ordination of muscular action. In some way or other the shocks disturb this function, temporarily at

least, and, in two of the cases (II. and VIII.), quite persistently.

The second principal feature of the disease is venous congestion, and from it no patient escaped.

I think I am justified in this assertion, although Cases IV., VI. and XII. were quite singularly exempt from the desire to elevate the head while lying down, which was so marked in other patients.

The unusual coldness of the hands and feet: the relief from soaking the feet in hot water; and the temporary alleviation from eating, stimulants, and active physical exertion, are additional evidence of passive hyperæmia.

Still, we miss from the list some of the characteristic symptoms of that condition. I am not aware of any description of congestion of the cerebellum, either active or passive, existing in medical literature, but, in some of the above cases, the shock and subsequent congestion were located in the cerebrum, and, even in these we miss the stupor or somnolence with frightful dreams, as well as the excessive wakefulness, which sometimes alternates with drowsiness in ordinary passive cerebral congestion. More than all, we mark the entire absence of retinal hyperæmia, which, although carefully looked for, was never found in any of my cases, with the exception of the first, and, even then, was slight and temporary. If we confine our view to those cases where the shock was occipital and the congestion apparently in the cerebellum only, no diagnostician can fail to note the lack of many and even most of the symptoms laid down

by our authors as characteristic of either active or passive congestion of the brain.

Still, the phenomena which did obtain can be attributed to no recognized pathological condition except that of venous congestion, and we must be content to believe that this was the true state of the case. But this conclusion certainly opens up a new field in the natural history of this form of disease, and we must be ready, hereafter, to admit the possibility of the existence of cerebellar congestion apart and distinct from congestion of the hemispheres.

That the congestion extended, on the one side, to a portion of the hemispheres, and, on the other, to the upper part, at least, of the spinal cord, cannot be doubted. This is made clear by the occurrence of myalgia of the nucha and paralysis of the arm in Case II., by the ataxic symptoms of Cases II. and VI., and by the phosphenes, chromopsia, illusory vision, and unconsciousness after shock, exhibited in other cases.

It appears to me that we best account for all the phenomena of the congestion if we assume its location in the vertebral arteries and their corresponding veins. For, while from these arteries the cerebellum derives its supply of blood, they send branches, on the one hand, to the upper part of the cord and to the muscles of the nucha; on the other hand, some of their ramifications extend to the central ganglia of the cerebrum. Thus we might get true cerebral phenomena without general cerebral congestion.

Let us now regard more closely some of the peculiar features of individual cases.

In Case II., we meet with a close connection between shock and gastrodynia, and the fact that the symptoms associated with the attacks of the latter, viz., vertigo, nystagmus, etc., were the same as those manifested afterward, when the shocks were apparently located in the cerebellum, seems to me to indicate that both classes of seizure were essentially the same, and differed only because of the change in the *locale* of the shock. Thus, when the phenomena were those of gastrodynia, probably the site of the explosion was in the gray matter of the medulla ; while, in the other instances, its location was in that of the cerebellum.

Another peculiar symptom, which appeared only in this case, and in Case IX., was that form of vertigo where all objects seemed to be rapidly passing the patient in one direction. When we also recall the paralysis of the left arm only, which occurred in this patient, is it not rational to suppose that this revolving vertigo is to be attributed either to the implication of the right lobe of the cerebellum only or to the more severe disturbance in that lobe?

In Case II., and, in a minor degree, in Cases VIII. and IX., we meet with the only decided examples of disturbance in the power of co-ordination. This brings us face to face with that puzzling question of the relation of this function to the cerebellum. It is a problem which must

still be considered as unsolved. The only point which can be regarded as settled concerning it is, that at least one half of that organ must be diseased before inco-ordination is exhibited. If this be so, the cure of the paralysis in this patient, and his almost complete restoration to health, may be considered quite a triumph of medical art (*vide infra*).

In Case III., we come upon the sufficiently startling phenomenon of unconsciousness after shock. As to the diagnostic value of this symptom, remark will be made under the appropriate head. I would here only point out that, in this case also, we find the most marked evidence of the implication of the cerebral ganglia in other respects. Such are chromopsia, illusory vision, decided amblyopia, etc. The tubercula quadrigemina must have been affected in this instance. In any case, manifesting disturbances of the cerebral ganglia, it is probable that unconsciousness may, sooner or later, be developed. The absence of a loss of consciousness in some of the cases above narrated is more remarkable to me than its presence in these. In several of them the shock with its concomitants and sequences appeared to be located in the hemispheres, and yet no loss of consciousness followed any attack, however severe. I confess myself unable to assign any sufficient reason for this. Similar remarks are *apropos* to the development of delirium, which, on one occasion, followed a seizure in this case. Why delirium at all in any case, if it happened but once in one case? It is a conundrum past my guessing.

Still another peculiar feature appears in this with one or two other cases. The shock is followed by a thrill which passes down the spine to the extremities, thus reversing the ordinary occurrence of aura both in time and direction.

Case VI. exhibits the sole instance of abnormal conditions developed in the sexual organs by this disease. The manifestation of anæsthesia in the feet of this patient gives clear evidence that the posterior columns of his spinal cord were implicated in the congestion, and to this, doubtless, his sexual erethism is to be attributed. At any rate we are sure of one thing, viz., that such abnormal phenomena are exceedingly common in diseases of the cord, while they are correspondingly rare in disease of the cerebellum. And if it should prove that my views of the seat of this disease are correct, quite a list will be now added to the not very extensive one of maladies of the cerebellum which have shown no disturbance of the sexual organs, and thus contribute somewhat, if only by exclusion, to our knowledge of the functions of that too little known portion of the nervous system.

Case IX. is a very remarkable one, but its peculiarities are chiefly connected with the subject of diagnosis, and will be discussed under that title. The same remark applies to Case XIII.

Aside from these individual peculiarities the symptoms of the disease are quite similar in all. We have shock, congestion, and vertigo as the great leading characteristics. While, conspicuous by their absence, are convulsions, disturbances of

the pupils, the epileptic outcry, frothing at the mouth, stupor or mania, loss of memory, decided intermission of symptoms or free interval between the paroysmxs, and, in most cases, loss of consciousness.

PATHOLOGY.

WHAT is *shock?* This is a question which it is difficult to answer. Probably, it is properly classed under the head of what Hughlings Jackson terms "discharging lesions." By this term, if I correctly apprehend his idea, he means a tendency in the gray matter of the nervous system to generate force in an explosive manner instead of quietly and regularly. As if the portion of gray matter affected stored up its force as a Leyden jar does electricity, and discharged it all at once when filled to overflowing. This phenomenon he assumes as the basic fact of epilepsy, and, if I mistake not, he holds that all such explosive manifestations, anywhere in the body, are epilepsy and nothing else. Here we must take issue with him, and will do so farther on. The explosion of epilepsy is held to be in some vaso-motor centre, and to be or to cause an anæmiating spasm of the cerebral arteries. This sudden anæmia produces the convulsions seen in that disease, while the reactive relaxation of the arteries and their corresponding veins induces the congestion and stupor which form the second stage of the epileptic seizure.

Is the shock of the disease under consideration a parallel occurrence? I cannot think so. Such a theory seems to agree fairly well with the symptoms of most cases of epilepsy, but when we attempt to stretch this pathologic coat to the dimensions of the new affection, we find awkward gaps in the seams. True, an anæmiating spasm of the vertebral arteries need not necessitate convulsions, nor unconsciousness, nor some of the other epileptic phenomena. But how is it when we find the shock occurring in the hemispheres or indefinitely anywhere in the head with subsequent and clearly defined congestion of the cerebrum? And why should the congestive stage in epilepsy be so brief, and that of the new disease be protracted to weeks, months, and years, if it holds the same relation in both instances to the discharging lesion?

Again we may inquire, if the gray matter of the vaso-motor centres be capable of an explosive generation of nervous force, why may not gray matter anywhere be so diseased and manifest the same phenomenon? And is there any reason why an explosion in the *corpora dentata* of the cerebellum or in the cortical matter of either the cerebellum or cerebrum should not induce persistent congestion, or why, in other instances, such persistent congestion may not postulate an explosive condition in the gray matter? I can see none.

We will, therefore, assume, as opinions, which, probably, can neither be proved nor disproved at present:

First; That there are varieties of discharging lesions.

Second; That the symptoms produced by them differ as the sites of these lesions vary.

Third; That the *locale* of explosive action in this disease is not the same as that of epilepsy, wherever that may be.

That the shock of the new disease may differ from the explosion of epilepsy in nature as well as in location is not only possible but probable. If it did not, we surely might expect a development of epilepsy in some of the above cases; for, in several of them, the shock has changed its site already, and, should it happen to strike upon the epileptic focus, a paroxysm of that kind certainly ought to result. The fact that many years have passed without such an occurrence gives considerable ground for the opinion that the difference between the corresponding phenomena in the two diseases is a decided one, both as to nature and location.

There is far less doubt concerning the second great characteristic of this malady. It appears to be congestion of a passive form. But even here there are difficulties. In no case, even where the phenomena were otherwise cerebral, was a corresponding degree of congestion found in the retina. In most instances, none at all. Where the disturbance was altogether in the cerebellum, this might not be astonishing, though, not seldom, the presence of tumors in that organ produces the classic "choked disk." But how can a patient have general cere-

bral hyperæmia, and yet the circulation in the retina be undisturbed? Some of the patients, too, found no increase of distress by lying down, and had no desire to elevate the head when doing so: so that, if they had any congestion, it must have been very slight. Still, on the whole, the evidence is in favor of congestion, and, usually, of cerebellar congestion only.

With the location of the malady in this part of the encephalon, also agrees the symptom of vertigo, which forms so marked and distressing a feature of most of our cases. Whatever doubt may remain in the minds of physiologists as to the other functions of the cerebellum, little, if any, now exists as to its being the centre of equilibration and co-ordination. The experiments of Flourens, confirmed by many others, leave no uncertainty upon this point. So that we are quite prepared, not only for the occurrence of vertigo in these cases, but for its greater prominence and intensity in those in which the shocks were felt in the cerebellum.

With the location of the disease in this organ mainly and usually, agree all the other symptoms recorded, although, as before stated, we must allow that the congestion frequently exceeds that area.

The question whether what appears to be a functional trouble, like this, may terminate in organic disease, is a very interesting one. That it has not done so as yet in any case, however protracted and severe, is proven by the fact that all

the patients have been either decidedly relieved or cured. Still it should be remembered that the congestion is very prolonged in this disease, and that such a condition is pretty sure to bring about organic change sooner or later.

PROGNOSIS.

Of the ultimate cure of cases of this kind I think there can be no doubt.

In many instances, however, the course of the malady will be essentially a chronic one, and eradication of it, at least by drugs alone, will be a process covering months rather than days.

Were it possible to combine medical treatment with a radical and entire change of scene, diet, and habits, cure could, doubtless, be much more speedily attained. Indeed, the latter alone may prove sufficient in some instances, although I have known of cases in which the experiment has failed, and do not know of one in which it has succeeded.

DIAGNOSIS.

There can be no difficulty in distinguishing this disease from cerebral anæmia.

The drowsiness, somnolence, and even complete coma : the irritability, fretfulness, and restlessness, extending sometimes to delirium or insanity : the

pallor of the retina : the relief in a recumbent posture, etc., so characteristic of anæmia, form a picture very different from that which we have been regarding.

Until the receipt of the following letters from my friend Prof. W. A. Hammond, of New York, I had not supposed that it was possible to classify these cases under the head of cerebral hyperæmia. But since so distinguished an expert has expressed an opinion that they properly belong there, the question deserves close attention.

I take the liberty of introducing Prof. Hammond's letters here, since they bear upon other points in the diagnosis :—

43 WEST 54TH STREET, NEW YORK,
May 11th, 1879.

MY DEAR DOCTOR : I have read your essay with interest, and am glad you have called attention to an important condition. I do not think it is epileptic, for I, differing from Hughlings Jackson, recognize no epilepsy without loss of consciousness ; but it is epilepsy minus the loss of consciousness, or, rather, epilepsy is it plus the loss of consciousness. It is epileptiform, certainly. I have seen a number of cases of the kind. With you, I regard the affection as a "discharging lesion," but I think every body has such things more or less—I have had, I know—and I would not regard it as a disease unless the discharges were frequent. I think the morbid physiology is congestion, probably, of the medulla ob-

longata. While I do not think it is a new disease, I do not know that any one, before you, has written definitely on the subject. In my experience the shocks are most apt to occur while the patient is asleep or just going to sleep or awaking; at that time, in fact, when the spinal cord is most influential. All of which goes to show that probably the seat of the lesion is in that system. I shall be glad to hear of your farther observations on the subject.

Yours sincerely,

W. A. HAMMOND.

The second letter bears date nearly a year later, and the doctor has changed his mind as to the relations of the disease to epilepsy since the perusal of a second paper by the present writer, upon this subject:—

March 7, 1880.

MY DEAR DOCTOR: I have read your paper with interest, and am inclined to think you are entitled to great credit for insisting upon the prominence of certain imperfectly noticed symptoms. They are not epileptic nor even epileptiform, but I think the pathological entity is cerebral hyperæmia. They assuredly constitute a condition to which special attention ought to be given. I have met with such cases, as you will find in my writings, but I have never described them so fully as you have. I have regarded them as being either cases of cerebral hyperæmia or of epilepsy. The

latter alternative I am now satisfied is not tenable. With many thanks, I am yours sincerely,

WILLIAM A. HAMMOND.

That there is hyperæmia in this disease has been already admitted. But how Dr. Hammond can call it cerebral is past my comprehension. I have read his writings carefully, and do not find mention of shock in his cases of cerebral hyperæmia. Nor do I find here the characteristic symptoms which he and others point out as distinctive in that disease. It is true that in both affections we have vertigo, and a desire to keep the head elevated while lying down. But sleeplessness is a marked feature of cerebral congestion, and seldom or never occurs in this disease. Equally conspicuous by their absence are the suffusion of the face and conjunctivæ: the fullness of the retinal veins: the general headache and confusion: the loss of speech, convulsion, mania, and disturbance of the mental faculties.

In simple cerebral hyperæmia there is no constant reference to the occiput as the affected part. Pain and discomfort are located in the vertex, sinciput, or entire head. And, no matter how protracted the congestion may be, no shock of any kind is described in the works of Dr. Hammond or others on nervous affections.

Doctor George M. Beard, a neurologist, in an article in the New York *Medical Record* (May 8th, 1880), says "another symptom of neurasthenia is *explosions* in the head. A homœopathic practi-

tioner, Dr. Searle, has lately published a number of cases where explosions of this kind occurred, and he has described these under the title of 'A New Form of Nervous Disease.' Rightly analysed, these explosions in the brain are not masked epilepsy, nor are they epileptoid in any sense. They are merely symptoms of the neurasthenic state, particularly when the brain and upper portion of the cord are attacked. There are very many cases where the jerkings of the muscles, often throwing the body up from the bed, occur, and these symptoms of explosions and jerkings may also appear at other times."

It is very evident from this extract that Dr. Beard does not know or realize what "*shocks*," as described by our patients, are. Otherwise he would not name them in connection with the jerkings or startings during sleep, which are so slight and familiar a phenomenon, not only in mankind, but even in healthy sleeping dogs. A shock which arouses a strong man from profound sleep to vivid consciousness, with a conviction that he is about to die at once, which causes him to break out into a profuse cold perspiration and to tremble with fright, which is accompanied by vertigo sufficiently intense to alarm the most phlegmatic, is a far different phenomenon from simple jerking of the muscles during sleep. It is my impression that it would not require more than one such shock to fully convert Dr. Beard.

That many or most of the above patients were neurasthenic is quite possible. So, probably are

those who suffer from neuralgia, gastrodynia, migraine—in short, any disease. But that does not negative the propriety of classifying their maladies into separate divisions. Surely, Cases V., VIII., X., XI., and XII. are far from being types of exhausted nervous energy, and yet they had this disease in its severest form. If they are neurasthenic, what can the rest of mankind be? Again, if this affection, the main symptom of which is shock, be "nothing but neurasthenia," why have not more of Dr. Beard's long list of cases manifested shock as a symptom? I am not a little confirmed in my opinion of Dr. Beard's views by having at present a former patient of his (Case XII.) under my care, who, after two years of treatment by him upon the theory of neurasthenia, remained in the same condition, but who has responded readily to treatment based upon my own views of his case, within a space of two months.

Can we distinguish this disease from epilepsy?

I have given this question very careful consideration, and am of clear opinion that we may answer affirmatively.

The importance of our diagnosis here can scarcely be overestimated.

On this head I must first remark that, if the cases above detailed are epilepsy, the views of every standard author, excepting perhaps Hughlings Jackson, must be abandoned. Even his *schema* must be enlarged, for he describes no cases which wander so far from the accepted type of epilepsy.

But, to the patient, this question of diagnosis is

of far higher import than to the purely speculative physician. The symptoms, sequelæ and, for the most part, the well known incurability of epilepsy, naturally fill his mind with horror. To be liable at any moment, and amid any surroundings, to an attack which may expose him to imminent dangers : to gaping curiosity : which may involve the unconscious commission of acts from which the mind shrinks back appalled : to carry about a blighted intellect—a seared and shrivelled memory ; and, worse than all, to know that, if a parent, one's progeny is forever tainted, or, if unmarried, that every moral consideration prohibits him from enjoying the blessedness of conjugal love—moral considerations which society (at least in the present state of medical art) ought at once to crystallize into inexorable law—to the patient, I say, this matter of diagnosis comes home with terrible significance. And, to him, the question whether his malady must be pronounced epilepsy, or a variety of that affection which is liable at any time to develop into the fully-fledged disease, is quite as important as would be his acquittal or condemnation for some heinous crime to wear for life the chains of a galley-slave in the olden time.

This matter of diagnosis from epilepsy, therefore, deserves the most careful, minute, and unbiassed scrutiny.

As we have seen, Hammond, Beard, and Charcot (see preface), unite in saying that this disease is not epilepsy, nor epileptiform. These are,

surely, high authority. But I do not deem it right to dismiss the question upon even their *dicta*.

In the first place, it may be said that, in the present state of our knowledge, we can come to no absolute and positive conclusion, any more than could the scientists of an earlier day determine what is now plain to all, viz., the essential differences between typhus and typhoid fevers. As was the case with them, the pathology of neither of the diseases under consideration is established. And until that is settled, probabilities only can be estimated. But, surely, pathology aside, the gap between typhus and typhoid was not so great as between epilepsy and the new disease.

Our dilemma is, however, by no means an unusual one. In fact, it is common in the field of functional disease, and, probably, always will be. It takes us at once into that region of deepest interest and profoundest mystery, viz., cell-life—cell vitality. An attempt to follow it thither can, at the present time, lead to no useful practical result. And so, in the absence of any accepted pathological basis for epilepsy, and happily lacking even a single post-mortem in a patient afflicted with the new disease, our inquiry, though not the less interesting or necessary, must be more superficial.

Let me state, plainly and simply, my *theorem*:

There is a new form of disease—one never before described in books and comparatively recent in occurrence—which, although it may be called epileptiform, is not epilepsy nor epileptoid, i.e., never develops into epilepsy.

It is a disease which does not involve destruction or impairment of mental power, nor mania: it seldom produces unconsciousness: it is marked by decided symptoms not to be found in cerebral hyperæmia, neurasthenia or epilepsy: from it are absent many of the conspicuous and distinctive symptoms of those diseases; and it is almost or quite always curable.

Now, if we accept the views of the very large majority of writers upon epilepsy we shall have no difficulty in our diagnosis. Kussmaul and Tenner, Van-der-Kolk, Brown-Séquard, and a host of others, hold that the one constant and uniform symptom presented by all epileptics, is loss of consciousness. This may be very brief, as in *petit mal*, but it never fails to occur.

Nothnagel is even broader in his view. He says (*vide* Ziemssen's "Cyclopedia"), "two symptoms are to be regarded as *essential* in the seizure. First, loss of consciousness, and, second, more or less extensive convulsions." He further says, "those states should be regarded as epileptoid, *i.e.* as caused by central epileptic change, in which symptoms show themselves paroxysmally, for the development of which the same physiological processes should, or at any rate may, be assumed, as produce (when developed in greater intensity) the usual epileptic attacks. But, it should be kept clearly in mind *that, as in genuine epilepsy, these paroxysms constitute the principal feature of the disease, while the symptoms of the interval, on the contrary, stand in the background.* . . . The only exception would be when they can be shown to be, in

some sort, a consequence of the epilepsy. *The certainty as to whether a case be one of genuine epilepsy or not, is to be gathered from the occurrence, sooner or later, of real paroxysms in place of or alternating with these questionable seizures.*"

Hughlings Jackson alone, with some followers, takes the ground (*vide* "West Riding Hospital Reports"), that the presence of a "discharging lesion" is the sole distinctive characteristic of epilepsy, and that all cases presenting this feature are, *au fond*, that disease. In his opinion, "a sudden and temporary stench in the nose with transient unconsciousness, a sudden and temporary development of blue vision, a spasm of the face with stoppage of speech, a tingling of the finger followed by spasm of the hand, and certain vertiginous attacks" are all epilepsies.

It will thus be seen that the vast majority of writers on epilepsy are upon our side in this question of diagnosis. Judged by Nothnagel's standard, than which none can be more reasonable, the cases detailed herein must be excluded even from the class of epileptoid states.

For, surely, although the shocks do "constitute a prominent feature," "the symptoms of the interval" do not "stand in the background." In many instances, as has been pointed out, the "symptoms of the interval" are continuous and very distressing. They frequently exist long previous to the development of shock, and may even constitute the sole phenomena of the disease.

Nothnagel also points out, as especially decisive

the fact that, however masked or imperfectly developed epilepsy may be, sooner or later unmistakable paroxysms will occur.

Now, if we sum up the time during which the above patients have suffered from this malady, it reaches a total of nearly one hundred years. And yet, in not a single instance, has a well-defined paroxysm of epilepsy appeared.

The most doubtful case of the whole list has suffered from the disease fully a quarter of a century, and has never had one fully-fledged attack of epilepsy. If I could estimate together all the cases I have seen during the past seven years, I am sure the total would exceed two centuries, and yet no epilepsy. With Hughlings Jackson, then, and with those who adopt his views, is our sole difference.

In the discussion with them, I would first remark that the symptom of shock is essentially different from the corresponding phenomenon in epilepsy. Sufferers from that disease do not speak of any sensation which they designate by this term. Where there is no aura, they are conscious of nothing at the moment of attack. They fall instantly into either spasm with unconsciousness, or into unconsciousness alone, or into spasm alone. Where aura does exist, the instant it reaches the head unconsciousness or spasm follows. If attacked during sleep, they do not wake, and are even unaware that a fit has happened at all. However slight the explosion, if it affects the head, consciousness is impaired, or, if not impaired, it

is never quickened. But in our cases the shock is always felt. If the patient be asleep, no matter how profoundly, the shock arouses him instantly to the most vivid consciousness. Every faculty of the mind bursts at once into full activity. And, instead of a tendency to subsequent coma, the sufferer has to court renewed sleep as if its approach had never been felt. If the seizures occurred in the day time, in but two cases were they followed by unconsciousness. (These will be discussed as to their peculiar features hereafter.) In all other instances, although the shock was so severe as to throw the sufferers to the ground, no loss of consciousness was exhibited, even though the trouble was felt to be in the region of the hemispheres. In the large majority of instances it was referred to the occiput, and accompanied by severe and often prolonged vertigo.

All these phenomena have very little as a parallel in the history of epilepsy. It may be that in both diseases the seizure is essentially a discharging lesion, but it would certainly seem that it is a very different thing in the two maladies.

Dr. Hammond expresses his opinion that there are many kinds of discharging lesions. He even deems them not inconsistent with fairly good health unless they become frequent. And, certainly, there are many explosive diseases, like migraine, angina, and gastrodynia, for the attacks of which a discharging lesion forms a very pretty theory. But we doubt whether Jackson can convince the medical world that all these are epilepsy.

In regard to the second characteristic of the new disease—congestion, we find a condition in epilepsy similar, but identical neither in location nor duration. The congestion of epilepsy is quite temporary, seldom continuing even for an hour, and then passing off so completely as to leave the patient feeling even better than before the attack, while the congestion of the new disease is prolonged for months and even years at a time. Ophthalmoscopic observation shows a marked hyperæmia of the retina during the congestive stage of epilepsy. But no such retinal congestion can be discovered in the new disease. The *locale* of the hyperæmia is also different, as has been already observed. The intermediate symptoms of the epileptic, when they do occur, are very brief, and referable solely to the cerebral hemispheres, such as mania, loss of memory, mental automism, despondency, quarrelsomeness, rage, etc. On the contrary, those of the new disease are referable, for the most part, to the cerebellum and the spinal cord, no intellectual disturbance being manifested.

Again it is to be remarked that, generally, the more infrequent and slight the epileptic attacks, the fewer and more temporary the intermediate symptoms: while, in the cases cited, the severity of the symptoms of the interval have borne no relation to the intensity of the shock. They are often quite as violent when the shocks have been feeble or non-existent as where the paroxysms happen often and are severe. In the very large majority of epileptoid cases the seizure is brief

and slight, and no intermediate symptoms whatever occur. But in only one case described above (XV.) has a shock ever happened without very abundant, distressing, and protracted symptoms following.

The vertigo of the new disease is also very much more intense and prolonged than in epilepsy. It is seldom mentioned at all by the epileptoid patient, and, when it does occur, it is very trifling and temporary.

Quite as distinctive is the uniform testimony that no deterioration of mental power has been experienced by our patients, whereas repeated attacks of even *petit mal* soon leave their marks upon the memory and other cerebral functions.

In two of the above cases only do we meet with the symptom of unconsciousness after shock. The most decided of these is Case III. Here quite protracted loss of consciousness occurred twice in the history. There was, however, no stertorous breathing, nor any other epileptic symptom. It cannot be doubted that, in this instance, the explosion involved the hemispheres. But who ever saw an epileptic seizure so violent as to be followed by an hour of unconsciousness, with an entire absence of frothing mouth, bitten tongue, stertorous breathing, or convulsions? The very fact that the shock, in this case, did so affect the hemispheres as to produce loss of consciousness, and yet failed to produce such symptoms, is evidence of the strongest kind that the explosion of

epilepsy and that of the new disease differ in kind as well as *locale*.

Case IX. demands a few words here. It must be acknowledged that, in its review, the followers of Hughlings Jackson would find considerable ground for the diagnosis of epileptoid. And, if the period, from the time the patient left the army up to the date of the cessation of the spasms under the use of Belladonna, be alone considered, it must be owned that the case has some epileptoid features. The patient, himself a physician, states, however, that no one of his many colleagues who saw him at that time diagnosed his case in that manner. And I insist that it is not proper to select a short period like this for diagnosis. Here is a man who has, all his life, manifested an irritable spine, and whenever his liver has become deranged has been sure to have some special exhibition of that irritability. He has had shocks, similar to those described by other patients, for upward of a quarter of a century, and yet, in that time, has never had a well-marked paroxysm of epilepsy. This, of itself, is convincing evidence against that view of his case, as also are the facts that there has been no mental deterioration, and that the intermediate symptoms have been both abundant and severe.

But let it be granted, for the sake of argument, that, during the period referred to, the disease was epileptoid. This does not prove that he had not then, and has not since had, any other disease of the nervous system. It is possible that he had epileptoid in 1864, and was cured of it by Bella-

donna. Certainly, he has had nothing of the sort since that time. It has only been since the shock of 1876 that the malady has, in a marked manner, resembled the others which I have detailed. That a man, in his lifetime, has had convulsions or chorea, and, afterward, has epilepsy, does not prove that those affections were epilepsy, nor that it is improper to classify them as separate forms of disease. I have never claimed, and do not now claim that a person may not have, successively or even at the same time, both epilepsy and the new disease. A patient may suffer from both migraine and epilepsy, or neuralgia and epilepsy, or paralysis and epilepsy, or gastrodynia and epilepsy. Shall we, therefore, conclude that these complaints are epilepsy, and nothing else worth naming and classifying, simply because they are coincident? Surely, such a deduction would be highly unphilosophical and improper.

I have endeavored to take a calm and unprejudiced view of this very remarkable morbid development and can only say that, if it be either epilepsy or epileptoid, then the whole topic of epilepsy should be rewritten, and, what are now taken for its distinctive characteristics should be abandoned.

Many of the above remarks will apply when we come to consider the question of heredity in this disease, in the light of its diagnostic value.

Case XIII. presents us with a little girl who gives a perfectly characteristic account of a malady which must be classed under the head of the

new disease. Very careful inquiry leads me to the unavoidable conclusion that both her father and one of her uncles have epilepsy in a mild and not fully developed form. But shall we conclude, for this reason, that her disease is epilepsy? I trow not. Are there no instances in which children have escaped the epilepsy of their fathers? Will any one be ready to affirm that all the forms of nervous disease which such children may contract can be nothing but epilepsy? Surely not.

In concluding this argument, I will observe that I do not think an equal number of instances of any nervous disease can be named in which less evidence of hereditary transmission can be found.

DIFFERENTIAL DIAGNOSIS.

Epilepsy and Epileptoid.	*New Disease.*
1. Sudden and temporary loss of consciousness the most common symptom. If protracted, always stertorous breathing.	1. Consciousness seldom lost: usually quickened. When lost, no stertorous breathing.
2. Sudden and temporary spasm, with or without loss of consciousness.	2. Seldom, if ever, spasm of any kind.
3. Intermediate symptoms few and temporary. When present, mainly intellectual disturbances.	3. Intermediate symptoms constant and severe, with no intellectual disturbance.
4. Vertigo unusual and slight.	4. Vertigo very common and violent.

5. No prodromæ.	5. Prodromæ frequent and like intermediary symptoms. Same symptoms often occur without shock.
6. Influence of heredity clearly seen.	6. Hereditary influence very rarely seen.
7. Frequent development of *grand mal.*	7. No development of *grand mal.*
8. Loss of memory.	8. No loss of memory.

GENERAL TREATMENT.

Of course, our attention should first be directed to the removal of all exciting causes. We should regulate, as carefully as may be, the diet, employments, and sleep of the patient. Very frequently indigestion, constipation, lack of sleep, exposure to violent emotions, excessive business anxieties, excess in venery, or unhappy social relations, interfere seriously with recovery.

Upon the especial remedies for each of these, it is useless to dilate here. They must be adapted to each individual case. I may remark, however, my lack of faith in any sweeping rules of diet in this and similar diseases.

The only rule worthy of mention is that dictated by common sense, viz., the patient should eat what he knows agrees with him, and avoid what he knows to disagree. If, in addition, he will refrain from rapid and over eating, little more need be enjoined upon him in this regard.

With respect to the use of tobacco, tea, and

coffee, I may say, that, in my opinion, the temperate use of them (if previously habitual) ought to be allowed, unless there is evidence that either of them is hurtful in any particular case. To give my reasons for this opinion would be impracticable here.

As to stimulants, I am confident that those which contain much alcohol should be entirely avoided. They often relieve at first, but the reaction from their primary effect invariably increases the distress of the patient. Light wines, ales, and lager beer are often quite useful as palliatives. I would especially commend a glass of lager on retiring as often preventive of shock.

Sleep, sexual intercourse, and eating should be regular, sufficient, and not excessive.

Regarding employment, there is room for the exercise of much good judgment. In the case of patients whose business or professions demand much anxious thought and care, an entire change of scene and occupation, with plenty of rest, will often materially aid recovery.

I have found the Turkish baths of considerable service in relieving congestion. They cool the hot head, warm the cold extremities, and, by thus equalizing the circulation, prove very useful adjuvants. They may safely and profitably be taken every two or three days, and some will bear a daily repetition of the bath. The patient, however, should remain in the hot room only long enough to induce a slight perspiration, and, after the rubbing, the majority of persons should avoid

the plunge, in favor of the shower, which should not be too cold.

Bathing the feet in cold water every morning and rubbing them vigorously with a brush or hair mitten, after they are dry, will also be found very useful.

Vigorous physical exertion till one gets into a perspiration, is often a great relief.

SPECIFIC TREATMENT.

UNDER this head I place those drugs which are indicated according to the law of *similia similibus curantur*, since I believe prescription according to that law to be genuine specific medication. Of course there will be cases in which other remedies than those named below will be appropriate, and, in the selection of which the peculiar symptoms of each case alone can decide. I shall briefly sketch those which have proved beneficial to my own patients, and also a few others, which, on the basis of the homœopathic law, I judge may be useful. In this labor, I gratefully acknowledge the advice and counsel of Dr. S. A. Jones, of Ann Arbor, Michigan, who is recognized by all who know him as, perhaps, the greatest living master of homœopathic therapeusis.

I shall avoid a mere detail of symptoms, which would be tiresome and repetitious, only quoting enough to exhibit the basis of my selection.

ARGENTUM MET.

This metal and its nitrate have been much used —and abused—in the treatment of epilepsy, and there can be no doubt that they have sometimes cured that disease. The nitrate has been most prescribed, but, so far at least as our pathogenesy goes, the oxide is best indicated for the malady under consideration.

It must be allowed that, in many cases, the salts of a metal are close therapeutic analogues of the metal itself, but, not seldom, there are decided differences, and, in the present instance, we find it so.

The most distinctive symptoms in the pathogenesis are as follows. "Electric shock of the trunk terminating in an explosion near the foramen magnum. When half asleep, the prover was seized with vertigo and a violent shock of the body, after which vertigo and inclination to sleep disappeared. The nape of the neck feels stiff. There seems to be something foreign in the occiput—a kind of drawing and pressing on it."

There is evidence also, in the provings, of a decided influence over the power of co-ordination. Weakness, trembling, and incertitude in the lower extremities are recorded.

Case V. of the above list was speedily and permanently cured by this remedy in the sixth trituration. I have administered it also in other instances with decided benefit, but in none was the effect so prompt and unquestionable as in that girl. She

recovered entirely within two months and was decidedly relieved from the very outset. Why it should have been so much more effective in her case than in others I am unable to say.

CROTALUS CASCAVELLA.

The sudden, and almost explosive action of the serpent poisons naturally leads one to investigate their relations to this disease. Two of them only, however, present symptoms warranting their employment. The fact also of their profound disorganizing power over the blood, and the lack of any such conditions in this malady rather negatives any propriety in their administration. However we believe they have been effective in the cure of purely nervous diseases, and, as the symptoms recorded in the provings are so marked, I have deemed it proper to give them a place here.

Under Crotalus C., we find the following: "The entire skull-cap compresses the brain like an iron helmet: shocks in the head which almost throw her off her balance: bruised pain at the occiput: blue vision." The pains in the vertex and forehead, and the lack of occipital symptoms incline me to think this remedy appropriate only in those rare cases where the hemispheres are the part most involved in the disease.

GLONOINE.

"Vertigo in the occiput, vertigo when turning around, vertigo when turning, sudden and violent, so that he would have fallen had he not supported

himself by a tree—violent vertigo with transient dimness of vision : feels as if a cold cloth were spread over the brain : sensation as if the blood were rushing into the head : stiffness or tension about head and neck as if they had been laced in : attempted to lie down, but could not, because of increased pressure in the brain : dull pressive pain in the occiput and nape of the neck, as it were in the medulla oblongata — much aggravated by moving head or twisting neck : sensation of soreness in head—afraid to shake it, as it seems as if the brain was loose and sore : dull headache over vertex and especially in occiput—affects occiput and neck more than any other part : congestion in occiput like pressure—it seems as if he must lose his reason : sparks and flashes before the eyes : whirling, confused vision, objects dancing before eyes : black spots before eyes, with vertigo, worse when stooping : the muscles of the neck are so weary that he can scarcely hold up the head : indescribable sensation up the back of the neck : sensation of fullness, as of congestion, in the back of the neck, throat, and head : must have the head elevated."

There may be doubts about the correspondence of this drug with the disease under consideration. Glonoine has been usually regarded as homœopathic to active congestion—arterial congestion. But we do not know that the congestion of this affection is not arterial. At any rate Glonoine produces a long array of such symptoms as our patients complain of, and in the especial location

where their worst congestive symptoms lie. And I consider the remedy well worth trying under these circumstances. I have two patients now using it, and hope soon to be able to report results.

NAJA TRIPUDIANS.

During the proving of this poison, a young man complained of a sensation in the head, chest, ankles, and thighs for which he felt obliged to coin a word—"stounding." Whether this was anything like our "shock" is perhaps problematical, but, since Buckland, in his proving, describes the shock very closely, I am inclined to regard the "stounding" and shock as very similar sensations. Buckland says "of a sudden, I felt just as if some body had come behind me and struck me a severe blow on the head and neck, and, at the same time, I experienced a sensation as if a hot iron had been run into the chest and a hundredweight put on top of it. After staggering along for some minutes, I gradually recovered my senses."

Dullness and confusion of the head are also mentioned, with cold feet. Little is said of vertigo, however, and most of the distress is referred to the cerebrum. This remedy seems to have the clearest relations to Case X. of our list, and has also the constriction of the throat and chest complained of by that patient. To most of the other cases narrated, I think other remedies are more applicable, and am inclined to regard its usefulness in this malady limited to but few individuals.

SARRACENIA.

In this remedy, in my opinion, we have the most complete similmum of the new disease. I have but lately discovered how closely the symptoms of the two resemble each other, and, consequently, have had time to make only a limited application of it, but, so far, it has given me unbounded satisfaction. The drug has been most elaborated by Houat, and I am aware that his provings have fallen under a cloud of suspicion. But the symptoms upon which I most depend are corroborated by the experiments of such reliable men as Bute and Oehme to such a degree that I am willing to trust them.

"Vertigo with cramps in the neck: vertigo, dullness, with sensation of intoxication—does not know how to keep himself straight: he drops his head and supports it on his arms: heaviness of the head, with difficulty of thinking: dull feeling in the head as if stunned or stupefied—as if benumbed: a sudden shock through the head, after which the senses feel paralyzed: a sudden stroke from the right side of the head down to the right shoulder, and subsequent feeling of crawling, paralysis, and numbness in the shoulder and arm: rush of blood and burning heat of the head, with sensation as if it would split: sensation as if he had received a knock on the head, with vertigo, stupor, and vacillating gait—is obliged to support himself and lie down: sensation as if the head would be crushed on a wheel, especially in the

neck: tinitus aurium and sometimes detonations in the ears: amblyopia: looking at the light, he sees a multitude of rays which spread out (see Case III.): snapping in bones of spinal column on the least motion (a symptom quite common in my patients): weakness of the extremities—they feel easily benumbed: great weakness in the arms: numbness of the hands: paralytic debility of the hands (see Case II.): paralytic debility of the legs, so that the gait is vacillating."

This concludes the list of the remedies which have appeared to me most clearly indicated in this disease. I will mention, however, as worthy of study, the following as related to shock:

Digitalis, Ginseng, Kalmia, Lycopodium, Tabaccum, Zincum Sulph.

As related to the congestion:

Calcarea C., Carbo. Veg. and Animalis, Ferrum, Petroleum.

ANTIPATHIC TREATMENT.

I WILL take occasion in this place to speak of the influence of *Coca* in this disease, although I cannot regard it as antipathic in the strict sense of the word. It certainly is not homœopathic, but it is still (however it may act) one of the most reliable remedies for the palliation and, perhaps, cure of this malady.

I prescribed the chewing of coca leaves for Case IX. early in October, 1879. About six weeks later

he reported as follows : " Coca has had a magical effect upon me. It seems to act as a nerve tonic. After chewing the leaves for a few minutes, I feel physically strong and elastic, and mentally able to accomplish any amount of work. For instance, I feel weak in my legs and stagger : have a fagged feeling in my brain, which shakes and vibrates at every step. Now I commence chewing the leaves, and in a few moments, I am relieved. In half an hour my brain feels firm : I walk briskly, and feel as vigorous as ever. It seems to be acting curatively upon me, for I find myself chewing less and less of it. There is no alternate effect of depression. It also dissipates the dull occipital pressure and soreness."

Under date of March 26th, 1881, the same patient writes, " I owe my present condition of health to providence, fortune, or fate which led me to your office nearly two years ago. I do not take any more Coca, because I have attained to such a good state of health that I do not require it. I am able to do an immense amount of work with ease. In short, I consider myself well."

Cases I. and II. were also very greatly benefitted by Coca. Case XIII. was immediately relieved by it, and has had but one very slight attack of shock since beginning its use. Case X. was decidedly palliated by chewing the leaves. Cases III. and VII. could not use it, as it seemed to disagree with the stomach.

It has been my habit to prescribe it in the form of the leaf which is chewed and the juice swal-

lowed. I have also used the fluid extract and the spirits, or distilled extract, with equal satisfaction when they were reliable preparations.

Most, indeed nearly all, the leaves and extracts which are on the market at present, are entirely worthless. The virtues of the leaf are so volatile that they evaporate, and leave a valueless residuum, even in a few hours, when exposed to the air. The only place where good Coca can be obtained, outside of South America, to my knowledge, is 57 Beekman Street, New York. It is imported and preparations made from it by Mr. C. M. Fletcher. I have also had a very fine extract from F. A. Reichardt of 404 Fourth Avenue, New York. When the leaves are used, they should, immediately after purchase, be put into preserve jars and kept hermetically sealed, except as they are taken out for use, and then they should be carried in a rubber bag.

For my philosophy of their action, see the following essay.

When we regard the problem of cure from the antipathic standpoint, we have first to regard the remedies which have proved useful in other discharging lesions, and, secondly, those which have shown themselves capable of so stimulating the vaso-motor nerves as to bring about contraction in paretic blood-vessels.

Among the former stand the Bromides, Belladonna, and perhaps maximum doses of Nitrate of Silver. In the second list also rank the Bromides, Ergot, Hammamelis, Strychnia, and the

galvanic current. I have had little experience in the use of most of these drugs in this disease.

Case I. for four months, took the following prescription of Dr. W. A. Hammond :

℞

Sodii Bromidi, ℥ j.
Pepsin sach., ʒ iij.
Digitalis Tinct., ℥ ss.
Ergotæ, fl. ext.,
Hydro-chlor. Phos. Calc., } āā ℥ ij.

M. Sig.—One teaspoonful three times daily.

The result was palliative only, while the general health became so much impaired that he then desisted. In Case II., the Bromide and Phosphide of Zinc with Ergot, and the Bromide of Soda, were used for considerable time, in full doses, with temporary benefit only. Dr. H. B. Millard has obtained permanent cure of his cases, above reported, partly by the aid of this class of remedies. He also makes use of hypodermic injections into the neck, of Sclerotinic acid or Strychnia.

Hammamelis, in the form of fluid extract, is the best remedy of this class for the control of the congestion, but I think it is simply palliative. I have obtained quicker and more permanent results from the employment of the homœopathic remedies and Coca.

Of the use of the galvanic current I can say nothing experimentally. Theoretically, it should be beneficial.

SYNOPSIS OF THE

RESULTS OF TREATMENT,

MAY 12, 1881.

CASES I. and II., after being much ameliorated by the use of Coca and other drugs, have experienced very rapid and decided relief from all the remaining symptoms of the disease under the exhibition of Sarracenia tincture, five drops at a dose, repeated three times daily.

Case III. is reported as "about well." A variety of remedies were used for her by several physicians.

Case IV., after partial relief by means of Coca, has wandered into the hands of an irresponsible practitioner, with results which are unknown to the writer.

Case V. cured (*vide supra*).

Case VI. treated by other physicians, result unknown.

Case VII. reports decided relief from Glonoine[3], and Sarracenia tincture. Permanent result in abeyance.

Case VIII. was very rapidly cured by chewing Coca leaves.

Case IX. cured by Coca (*vide supra*).

Case X. was much relieved by the use of Coca, but reports, on May 10th, 1881, as follows :

" Since taking the Naja, I have no trouble with my head. I feel like myself, perfectly well."

Case XI. received but one prescription from the writer. Result unknown.

Case XII. expressed himself as much better after two months' use of Coca, and has not since reported.

In Case XIII. immediate improvement followed the use of Coca, and Sarracenia completed the cure. About six weeks were consumed in the treatment. The father and uncle are using the Coca for their epilepsy.

Case XIV. reports " no shocks since beginning the Coca." She is now taking Sarracenia with good effect.

Case XV. was cured by Dr. Baner with Phosphorus. The dose I do not know, but presume it to have been about one one-hundredth of a grain.

Cases XVI., XVII., and XVIII. are reported by Dr. Millard as cured (*vide supra*).

Cases XIV., XX., and XXI. were cured by Carbo. Veg.[3], Petrol.[3], and the fluid extract of Hammamelis.

Total cases	21
Total cured	15
Result unknown	4
Under treatment	2

ERYTHROXYLON COCA.

AN ESSAY,

BY

W. S. SEARLE, A.M., M.D.,

READ BEFORE THE

Medico-Chirurgical Society of New York,

MAY 11TH, 1880.

ERYTHROXYLON COCA.

Authorities: 1. JOHNSTON'S CHEMISTRY OF COMMON LIFE, Vol. ii. p. 116. 2. NATIONAL DISPENSATORY, 1879. 3. DR. CHRISTISON, Braithwaite, 1876, p. 339. 4. DR. DOWDSWELL, Lancet, 1876. 5. MANTEGAZZA, Prize Essay, Pharmaceutical Journal, 1859.

THE COCA is a bush which is native to Bolivia and Peru. It grows wild and is cultivated, forming an important agricultural crop. It is raised in seed-beds, and from these transplanted into regularly arranged plantations. In its wild state the shrub attains a height of about four feet, but under cultivation at the proper altitude it doubles in size. The steep sides of the valleys as high up as 8000 feet above the sea-level, where the mean temperature is about 65° Fahr., are often covered with the plants. After three years the bushes come into full bearing, and, in favorable localities, yield from three to four crops of leaves annually. These are picked when ripe enough to break on being bent, and are dried in the sun. They are afterward pressed into bales of from twenty-five to fifty pounds, which are first covered with moist hides as tightly as possible, and then with tarred gunny-cloth. In this state they come into market.

The annual production is variously estimated at from forty to one hundred millions of pounds.

Specimens of the shrub exist in the tropical conservatory at Kew and in the Royal Botanical Society's Garden, Regent's Park, London.

BOTANICAL DESCRIPTION.

The *Erythroxylon Coca** has spreading, purplish branches: small, yellowish, five-petaled flowers in axillary clusters of three or four. Ten hypogynous stamens; and oblong, red, smooth drupacea. The fruit contains a single albuminous seed. Leaves alternate, two inches long, ovate, obtuse, thin, with smooth, varnished surface. They have a slight odor like tea. Taste slightly bitter and aromatic. The best specimens, when chewed, impart a cool, numbed feeling to the mouth and palate, faintly like that produced on the lips by the contact of the tincture of the root of aconite.

CHEMICAL ANALYSIS.

Wackenrode (1853) found in the leaves a peculiar tannin which reacts with a green color to iron salts. This has since been called coca-tannic acid.

* *Erythroxylon* is the botanical name of an order of shrubs or trees all of which have reddish colored wood or bark. The word *Coca*, we are told by Johnston in his "Chemistry of Common Life," is derived from the Ayamara (South American Indian) word *Khoka*, signifying "plant;" just as in Paraguay the indigenous tea-plant is called *Yerba*, "*the* plant" *par excellence*.

Gaedeke (1855) isolated from them a crystalline alkaloid which was at first called erythroxylina, but afterward by Minann (1860) and McLossen (1865), the name was changed to cocaina. Maclagan first observed a volatile alkaloid which Lossen entitles hygrina. It is a thick, yellowish oil, of a burning taste and strong alkaline reaction, and having an odor like trimethyl. Probably other constituents exist, but they await discovery.

PHYSIOLOGICAL EFFECTS.

With the exception, perhaps, of the notorious Digitalis, no drug has so baffled all investigation into its effects upon the healthy human system. Some experimenters deride and decry its virtues as the merest fiction, while others are positive and enthusiastic as to its effects. Setting aside the fact that some persons are much more susceptible than others to substances of this class, I think we shall find abundant reason for this wide difference in opinion hereafter.

According to the National Dispensatory, very large doses have produced tetanic convulsions in animals. Smaller quantities give hyperæsthesia and dilatation of the pupils. A diminution of movement is apparent, seeming to be caused by a loss of co-ordinating power.

Bennett claims that on man cocaine, and the alkaloids of tea, coffee, guarana, and cocoa have identical effects.

During five days' use of the Coca, Ott found the solid elements of the urine diminished, while the

weight of the body slight increased. During his experiments the urine contained oxalate of lime.

Gazeau found it to increase the urea and diminish weight. In his opinion its power consists in its sustained excitation of vital force, added to which is an anæsthetic power which lessens the sense of fatigue and hunger—an opinion which has very little foundation in physiology or toxicology as at present understood.

An excellent account of the Coca is found in a work entitled "Un Voyage dans le Nord de Bolivie," by Dr. H. A. Weddell, Paris, 1853. This author denies the existence of the injurious effects which some travelers have attributed to its prolonged use. After careful daily observation of his Indians who chewed it in excess, he could not discover that it injured them. He says its effects appear to be gentle and sustained: that it seemed rather to affect the whole system than the brain alone; and, although without any true nutritive powers, it afforded support which differs from that of all other stimuli in not being transient and leaving no reactionary depression.

The following is an abstract of the experiments of Dr. Christison, reported in *Braithwaite*, 1876:

His first trial was in 1870. Two of his students had been thoroughly tired by a walk of sixteen miles, returning to dinner in the evening, having eaten no food since nine A.M. They then, instead of food, drank two drachms of Coca in infusion. Soon all sense of fatigue and hunger vanished, and they took another walk of an hour's duration

with ease and pleasure. They returned with good appetite, felt alert during the evening, slept well all night and woke in the morning refreshed and active.

In May, 1870, Dr. Christison himself walked fifteen miles, in stages, with intervals of half an hour's rest, and without food or drink after 8:30 A.M. He found the task excessively wearisome, and was as effectually tired out as ever in his life. The amount of urinary solids was taken every two hours. He found a decided increase during the forenoon, which diminished during rest after dinner. His normal pulse when at rest was 62. When he returned from his walk it was 110. Two hours afterward 90. He could do no mental labor in the evening and woke in the morning wearied and lazy.

Two days afterward he repeated this experiment with the same results. Four days after the last trial, and with the same dietary, he walked sixteen miles, in stages of four and six miles, taking, as before, half hour intervals of rest. During the second rest he chewed eighty grains of Coca. On completing the previous ten miles he was fagged enough to anticipate with dread the remaining six. He felt no effect from the Coca until he stepped out of doors, when, to his surprise, all weariness fled and he found that he could walk with ease and elasticity. He accomplished the six miles without difficulty, and ran up two flights of stairs to his room, taking two steps at once. The pulse registered 90, and

two hours after, 72. The urinary solids were the same as when not under the influence of Coca.

After his return and before dinner he felt neither hunger nor thirst, but ate well: in the evening was alert and not drowsy: slept well, and woke in the morning refreshed and free from fatigue.

On September 15th he ascended a mountain about 3000 feet above the road. It required two and a half hours to reach the summit, and he was so much fatigued that it required much determination to get over the last three hundred feet. His companions ate lunch, but he chewed instead two thirds of a drachm of Coca. He experienced no fatigue while going down, and after returning home felt no hunger, nor thirst, nor weariness. At six P.M. he took dinner, and felt lively and well during the evening. He had taken no food nor drink from eight A.M. till six P.M., and had chewed in all eighty grains of Coca. Eight days afterward he repeated the same experiment with even more complete results. His son also obtained quite equal effects.

His general conclusions are that Coca prevents and removes fatigue; suspends hunger and thirst, while it leave the appetite and digestion unaffected. It prevents excitement of the circulation under exercise; it probably diminishes the urinary solids, but of this he does not speak with confidence, because it appears to him that the investigation of the action of the so called paratriptics, or those substances which seem to lessen the

wear and tear of textures, involves considerations and precautions which have escaped the attention of experimenters on this interesting question, and which his own trials had not fully taken into account.

In a letter to the London *Lancet* (1876) Weston, the pedestrian, thus expresses himself: "So much has been said regarding my use of the South American Coca that I deem it a duty to correct an impression which is erroneous. During my first trial in London, on the 9th of February, while walking from my sixty-fifth to my seventy-fifth mile, I chewed the Coca leaves freely, acting under the advice of my medical adviser in America. I found they did not have the effect expected, that is, they would not keep me awake nor in the least stimulate my efforts. But, on the contrary, they acted as an opiate, and forced me to sleep, which was mainly the cause of my absence from the track for forty-five minutes after the seventy-fifth mile. Previous experience in America, taken with this, leads me to the belief that, far from being an assistance in any trial of physical endurance, the use of these leaves in quantity would prove a great detriment."

In direct contrast with this let us place a quotation from the traveller Von Tschudi:

"A cholo of Huari, named Hatan Huamang, was employed by me in very laborious digging. During the five days and nights he was in my service he never tasted any food, and took only two hours sleep each night. But, at intervals of

about three hours he regularly chewed about half an ounce of Coca leaves and always kept some in his mouth. I was constantly beside him, and therefore had the opportunity of closely observing him. The work for which I had engaged him being finished, he accompanied me on a two days' journey of twenty-three leagues. Though on foot, he kept pace with my mule, and halted only for his "*chacar.*" On leaving me he declared that he would willingly engage himself again for the same amount of work, and go through it without food if I would but allow him a sufficient supply of Coca. The village priest assured me that this man was sixty-two years of age, and that he had never known him to be sick in his life."

As illustrating the power of the Coca in preventing breathlessness, the same writer says: "When I was in the Puna, at the height of 14,000 feet above the level of the sea, I always drank before going out to hunt a strong infusion of the Coca. I could then, during the whole day, climb the heights, and follow the swift-footed wild animals without experiencing any greater difficulty of breathing than I should have felt at the sea-level. However, I always felt a sense of great satiety after taking the infusion, and did not have a desire for my next meal until after the time at which I usually took it."

Much has been written by various observers, especially by Poppig, of the baneful effects of Coca chewing. It is quite evident, however, that they, like some modern *soi-disant* philosophers,

who refer every recent disease to the influence of vaccination or to the use of tobacco, have looked through strongly prejudiced eyes, and have attributed all the imperfections and disorders, both of mind and body, which they have found among the half savage and debased Peruvian Indians, to Coca alone.

In regard to this point Von Tschudi, as the sum of his inquiries, says: "Setting aside all extravagant and visionary notions, I am clearly of opinion that the moderate use of Coca is not merely innocuous, but that it may be even very conducive to health. In support of these conclusions, I may refer to the numerous examples of longevity among the Indians, who almost from boyhood have been in the habit of masticating Coca three times a day. Cases are not infrequent of Indians attaining the age of one hundred and thirty years, who must, in the course of their lives, have chewed not less than 2700 pounds of the leaf, and yet retained perfect health."

So far as I can discover the only really scientific attempt to ascertain whether the use of Coca tends to limit the waste of the tissues, was made by Dr. Dowdswell in the physiological laboratory of University College, London, and is reported in the *Lancet* of 1876. Even these experiments were incomplete, since observation was limited to the temperature, pulse, and urea. The phosphates and chlorides were entirely overlooked.

The following is a brief *resumé* of Dr. Dowdswell's trial:

The amount of exercise was recorded : the food taken was similar in quantity and quality : the whole amount of urine for twenty-four hours was mixed and examined within one or two hours : the absence of sugar and albumen was noted. He was careful to get what he supposed was a good speciment of the leaves, which were swallowed in the various forms of a pill with lime or in infusions or extracts prepared in the laboratory of the college. His test consisted of examinations of the urine for ten days without the use of Coca, during which time he walked eighty-four miles, and for twelve days during which he walked ninety miles, and took, in the above forms, what he considers the equivalent of one half pound of the leaves. I will not give his tables as a whole, but have condensed the important part of his results.

The average urea without Coca was 1.73 per cent, and, with the Coca, 1.70 per cent, a difference in favor of Coca of only .03 of one per cent. Dowdswell therefore concludes that Coca has no effect, since it did not affect the pupils, heart, or skin, and did not produce either drowsiness or wakefulness. He thinks tea, milk, or even pure water have more decided effects than Coca. These are rash conclusions when it is remembered that he tested only for urea, neglecting the other urinary constituents, and when (as it seems necessary to conclude) his specimen of leaves was nearly or quite inert. He confesses that they were seven years old.

The following is an abstract from the prize es-

say of Mantegazza, which was published in the *Annali Univers. di Med.*, 1859.

Dr. Mantegazza resided and practised in South America for some years, and was conversant with the use of Coca in every form, both as employed by the natives and prescribed by himself. His account of its properties is most eulogistic. He claims that it stimulates the stomach and aids digestion. In large doses it may produce fever and slight constipation. In medium doses—from one to two drachms—it stimulates the nervous system and increases muscular power, rendering it independent of external influences, and inducing a happy state of tranquillity which it confers without impairment of strength. He recommends a warm infusion of the leaves after meals for weak digestion, or the effects of intemperance. He himself used it for two years without any injurious effects, and, though usually unable to work after dinner without headache and indigestion, these symptoms did not occur when he used the Coca. He advises the infusion for acidity and flatulence. He claims that its use by the miners renders their teeth white, though other authorities state the exact reverse. It is a useful tonic in nervous prostration, hysteria, and melancholy, but dangerous in congestion. He considers it better than opium in mental affections, and believes that, in sustaining nervous force, it is superior to all known agents. He cites eighteen cases of disease of varied character in which it proved curative.

The author of this paper first became acquainted

with the Coca in the year 1865. In May of the following year I obtained my first specimen from Peru. It was a bale of twenty-five pounds in weight, pressed into a solid mass and covered with hide and tarred cloth. It had, however, been six months on the way, had suffered from the curiosity of the custom house, and had thus lost much of its virtue by evaporation of the volatile element. Having at that time no opportunity for exact experiment, I chewed up the majority of the bale without other effect than a lessening of appetite and some increase of physical endurance. Being quite incredulous of the stories told of the effects of the Coca, I addressed a letter of inquiry to Dr. Alexander Stewart, of Arica, Peru, and received from him the following reply:

DEAR DOCTOR SEARLE: My experience with Coca extends over four years, during which period the native hospital of Arica, having a daily average of thirty-five patients, afforded me ample opportunities for observing its effects. The patients were chiefly Indians from the interior, they being the principal users of the plant. They chew the leaves, and, from their nutritive properties and power to allay hunger, they are enabled to travel day after day for three or four days without food or water. Thus they travel hundreds of miles through this arid country—water not being obtainable unless carried in calabashes. The statements set forth in Johnston's "Chemistry of Common Life," to which you re-

fer, are true in almost every particular. The narcotic effect is not so prominent a feature as its power to prevent hunger, thirst, and need for sleep. I have frequently observed patients, when convalescing from fevers, using large quantities of it. It has also the power of mitigating the difficulty of breathing, hæmoptysis, and drowsiness incident to traveling among the hills, 4000 feet above the sea. When going to Bolivia it was with difficulty the mule-driver could keep me awake. Only by repeated shaking could he accomplish that object, which was very necessary, as sleep under such circumstances is nearly always fatal.

It is not an astringent. It does not in any way shorten life. With regard to this point I have made every inquiry from gentlemen living in Bolivia for the past twenty years, and who have employed hundreds of these Cholos in their copper mines. They inform me that they have never seen any bad results from its use. On the contrary, natives have been found in the valleys overtaken by fever, and subsisting on it alone for several days. I have never observed that it dilated the pupils. Have given it with marked benefit in phthisis laryngea, and believe that it would prove a valuable addition to the materia medica.

Yours truly,

ALEXANDER STEWART, M.R.C.S.

Dr. Stewart also kindly forwarded to me the following letter :

CORO CORO, PERU, May 29, 1866.

Dr. Stewart :

DEAR SIR : In answer to your inquiries regarding Coca, I would reply that I have resided in this place for six years. To each of our laborers we give one pound of Coca leaves weekly, and to the boys one half pound. They chew them or drink the infusion. They take away hunger and the need for sleep. A person using them may go forty-eight hours without food or sleep. Though totally unaccustomed to it, I have chewed one-quarter pound in one night, the only effect being to disperse all desire for sleep. Many workers consume two or three pounds weekly.

Yours truly, GEO. GASSETT.

The perusal of these letters made it quite evident to my mind that Coca leaves as I had obtained them and Coca leaves in Peru were two quite different things, and I set myself to ascertain why this was so. From a colleague who had been in Peru I learned that my specimen, while undoubtedly genuine, as shown by the taste and smell, had to a very large extent lost its volatile properties, and with them its slightly bitter and strongly aromatic flavor. This I could well believe, since, on opening the bale in order to more carefully inclose its contents, I had noticed that the room was instantly filled with the aroma, and, although great care was taken to encase the leaves as tightly as possible, yet the daily opening of the can in which they had been placed, allowed

the escape of the aroma to such an extent that the deterioration of the remainder was very rapid. So that, long before the whole had been used, the flavor was almost lost, and the leaves, from being flexible and somewhat elastic, had become very dry and brittle. I learned, too, that much more of the volatile property of the plant was lost by the very crude manner in which the leaves are cured for the market in Peru. It appears that they are picked by hand, and then spread to dry in the sun, and I am credibly informed that the effluvia which escapes from them during this process is so powerful as to produce headache in those who are exposed to it. It is evident that in this volatile property resides a large, and, perhaps, the greater portion of the especial virtue of the Coca, since specimens which have lost it are inefficient and worthless.

It may now be remarked that just here we are to look for the reason for the very wonderful and otherwise unaccountable differences of opinion regarding the power and value of Coca to which we have referred. I have purchased many specimens of the leaves since my own importation of them in 1865, and I have never yet found a sample even as good as that then obtained. Those which I have bought from druggists in New York city, at various times, have been dry, brittle, and almost without flavor or odor. And if, as seems quite likely, it was with such specimens that Dowdswell and Weston experimented, one cannot wonder at the negative results obtained by them.

It is only within the past two years that even passably good Coca leaves, and, as a consequence, reliable preparations made from them, could be purchased in America. For about that period the importation of the leaves, and the manufacture of various extracts from them, has been carried on by Mr. Chas. M. Fletcher, of 57 Beekman Street, New York City. This gentleman, having spent a year in Peru, and having been forcibly impressed with the results there obtained from the employment of the Coca, determined upon their introduction into this country as a commercial venture. He entered upon that business, and is now the largest importer and manufacturer of the Coca and its derivatives. I made his acquaintance about three years ago, and found in his possession the only leaves which at all approached in value those of my own importation. Finding, however, that even so good specimens as those he was able to obtain from his Peruvian agents were comparatively poor, I advised him to order the green leaves prepared and packed with glycerine, to prevent mould and fermentation, and thus import them. This will be done as soon as the cessation of war in South America will allow, and then we may hope to have Coca in its full and pristine vigor, and can experiment with it satisfactorily.

Meantime I have instigated the following experiment with the best preparations attainable from Mr. Fletcher's stock, and through the kindness of my friend, Mr. Chas. M. Stillwell, the eminent practical chemist of 55 Fulton Street, New

York, I am enabled to lay before you the following tables. I may premise that I share Mr. Stillwell's opinion of the unsatisfactory character of this experiment, both for the reasons which I have given above and for those which he gives below. But I deem it worth while to put it upon record, since it is more complete than any which have been so far reported.

The experiments were made by Mr. Stillwell himself under my direction. He is about thirty-five years of age, and uses neither wine, coffee, tea, nor tobacco. During the recorded days he pursued his usual avocation of a chemist.

TABLE I.

C. M. S. Normal.

Date—September and October, 1879.	29th.	30th.	1st.	2d.	3d.	4th.
Specific gravity.....	1·019	1·023	1·026	1·030	1·030	1·030
Cubic centimetres.....	·280	·205	·205	·180	·160	·185
Total solids in grains (spec. grav. to 1·023).	82·099	78.087	82·854	83·334	74·075	85·649
Per cent of chlorine...	.....	0·368	.....	0·405	0·313	0·386
Per cent of urea.....	.....	2·483	.....	1·901	2·239	2·376
Per cent of phos. acid.	.....	... .		0·209	0·214	0·245

Average per cent of chlorine..... ·344
Average per cent of urea.... .....2·249
Average per cent of phosphoric acid.....1·222
Total solids, 325·892 grains in 730 cubic centimetres.

TABLE II.

C. M. S. Using a Mixture of Spirits and Fluid Extract of Coca in Equal Parts.

Date—1879.	Oct. 10.	Oct. 11.	Oct. 13.	Nov. 14.
Specific gravity	1·030	1·027	1·028	1·031
Cubic centimetres	·135	·157	·165	·192
Total solids in grains (spec. grav. to 1·023)	62·501	65·417	71·297	91·822
Per cent of chlorine	0·453	0·380	0·302	0·441
Per cent of urea	1·725	2·004	2·466	2·658
Per cent of phos. acid	0·176	0·236	0·181	0·227

Average per cent of chlorine ·394
Average per cent of urea 1·963
Average per cent of phos. acid 1·207
Total solids, 291·037 grains in 649 cubic centimetres.

Chlorine, increase of 0·050 per cent.
Urea, decrease of 0·2·6 "
Phosphoric acid, decrease of 0·013 "

TABLE III.

C. M. S. Normal.

Date—1880.	Jan. 12.	Jan. 13.	Jan. 14.
Specific gravity	1·034	1·034	1·029
Cubic centimetres	·137	·148	·192
Total solids in grains (spec. grav. to 1·023)	71·883	77·655	85·927
Per cent of chlorine	·623	·419	·672
Per cent of urea	2·215	2·252	2·666

Average per cent of chlorine ·571
Average per cent of urea 2·377
Total solids, 234·465 grains in 477 cubic centimetres.

TABLE IV.

C. M. S. Using 3j *Leaves Per Diem.*

Date—1880.	Jan. 15.	Jan. 17.
Specific gravity	1·033	1·034
Cubic centimetres	·148	·148
Total solids in grains (spec. grav. calculated to 1·023)	75·371	77·655
Per cent of chlorine	0·401	0·362
Per cent of urea	2·132	2·430

Average per cent of chlorine ·381
Average per cent of urea 2·281
Total solids, 153·026 grains in 296 cubic centimetres.

Chlorine, decrease of 0·19 per cent.
Urea, decrease of 0·196 "

NOTE BY MR. STILLWELL.

"The process used for the estimation of chlorine and urea was Liebig's, viz., with proto-nitrate of mercury. The phosphoric acid was estimated by molybdate of ammonia, the most accurate of all processes. Large amounts of urine were used for all these determinations, and all the percentage results are accurate to less than one tenth of one per cent. From the results I have obtained there seems to be but little action on the amounts of chlorine, urea, or phosphoric acid. The amounts of these ingredients are so irregular in normal urine that any deductions drawn from these analyses must be made with much uncertainty. In my opinion, it would require a much

longer time than I was able to give to the subject (taking one month, for example, for the normal test and the same for the use of the Coca), before definite conclusions could be reached."

I may add that Mr. Stillwell was careful to have his diet and work kept at about the same standard during the various days of the trial.

In regard to all experiments of this kind, such as have been undertaken by scientific men in respect to the influence of tea, wine, coffee, etc., upon the human body, it must be remarked that their difficulty and liability to error may be estimated from the very various and even opposite conclusions at which equally honest investigators have arrived. For example, Smith's experiments with tea (Philos. Trans., 1859), showed a great increase in the excretion of carbonic acid under its use, and he therefore concluded that it increased waste in the system. Coffee he found to have a similar though slighter effect. But other experimenters just as distinguished have come to precisely opposite conclusions, because they found that the use of tea and coffee diminished the excretion of urea. Smith claims to have proven that the true and only measure of waste from muscular tissue, at least, is to be found in the rate of elimination of carbonic acid gas from the lungs, and to have shown that the violent exercise of the treadwheel caused a scarcely appreciable increase in the emission of urea (Philos. Trans., 1862). In

this he is supported by Bishoff and Voit. But if his conclusions are correct, the general and indubitable experience of mankind in regard to the sustaining powers of tea and coffee must be abandoned. It has often happened to me, and I doubt not, to every physician as well as to every housekeeper, to find women of the laboring classes who work hard every day, and who live almost altogether upon tea, taking an incredibly small amount of ordinary food, and yet they maintain flesh and strength year after year at the same standard. How can Dr. Smith and his fellow philosophers reconcile such a state of facts with their experimental theories?

In respect to Coca, which must be regarded as a substance of the same class, we have the testimony of an entire nation, employing it constantly during centuries of time, as well as that of many who have used it by way of experiment, that it does in some way obviate the necessity for food and sleep to a remarkable degree—a degree unknown by those who do not use it or by the same men when not under its influence, and that it does enable one to undergo unusual exertion of both body and mind, without experiencing the fatigue which otherwise would surely accompany or follow it. If we eliminate the trials of those who (as seems probable), have employed worthless specimens of the plant, we have so much concurrent testimony upon this point as to render doubt ridiculous. And it appears to me that to insist that it has not these effects because we have, as yet, not

been able to show, from our partial experiments with imperfect specimens of the substance, that excretion of urea or of carbonic acid or of phosphoric acid is materially lessened, or because we cannot yet give the how or why, is quite as unphilosophical as it would have been, in a former age, to deny the growth of a blade of grass because we were ignorant of the processes of its development.

That tea, coffee, tobacco, coca, wine, and the various narcotics and stimulants used by mankind have an influence of some sort is sufficiently proved by the fact that mankind persists in employing them. Abundant facts prove that most, if not all, of them enable men to accomplish more work with less food than they otherwise could, and such facts cannot be controverted by any amount of experiments, however they may show an increase or non-diminution of waste under the use of these substances. Some time or other experiment will and must confirm these facts. When theory conflicts with fact, it is the theory which must succumb.

Whether or not the employment of paratriptics injures health or shortens life, is and long will be an open question. Meantime, it may help to calm the fears of some and confirm the faith of others (even though it proves nothing), to recall the fact that it is only three hundred years since tea, coffee, and tobacco have come into general use by the human race, having spread within that time from their local and limited habitats all over the world,

until at the present time it is calculated that, in regard to tobacco, for every man, woman, and child on the face of the earth about five pounds are annually used: and yet the average duration of life has increased and is increasing. In regard to the influence of tobacco we may refer to the investigations of Sir John Sinclair, the results of which are given in his "Code of Health," recently published. He found in the Pension Hospitals of the United Kingdom one hundred and fifty men over eighty years of age. Eighteen of these were over ninety, and several over one hundred, and yet, almost without exception, they were and had long been consumers of tobacco.

Probably the increase in the use of coffee and tea quite parallels that of tobacco, and the aggregate influence upon mankind must be something enormous.

It certainly ought to be evident to philosophers by this time that there must be some sound physiological reason why mankind has so universally adopted the use of these substances, and particularly why they have so adopted tobacco, which to the novice is a nauseous and disgusting thing. If it be held that this fact is to be explained by the enjoyment derived from its use, why has not its spread been equaled or exceeded by opium or haschish, substances whose effects are far more exhilarating, more powerfully intoxicating?

We cannot enter here upon a *résumé* of all the experiments which have been made upon these substances. Nor is it necessary. They are fa-

miliar to all who have studied the subject. And no theory is so consistent and accordant with all the facts and all experiments as this, viz., that in some way not yet wholly determined, they all supplement food or lessen the necessity for food. Some of them have a similar effect also in regard to sleep.

Now, since all physicians recognize that each of these substances has some effects prejudicial to the health of a part of those, at least, who employ them, it surely behooves us to attempt to determine which of them are most innocuous and endeavor to supplant the rest by these.

Is Coca, then, better than tea for the community in general? I believe that it is, and for the following reasons:

1st. Tea contains much the greater proportion of tannin, and is therefore, by so much, more productive of constipation. Coca does not have this effect. In fact I have cured chronic constipation by its use.

2d. If we are to credit Dr. Smith (loc. cit.) tea increases the amount of carbonic acid exhaled from the lungs, thus rendering more and purer air necessary. Now it is true that no similar experiments have been made with Coca, but it seems to be an undisputed fact that at levels high above the sea, where the atmosphere is so rarefied that rapid respiration, even while at rest, is necessary to the sufficient aëration of the blood, the Coca enables the hunter to engage in as active exercise as at sea-level. Surely this could not be, unless,

far from increasing the elimination of carbonic acid from the lungs, it rather diminished it, and that to a great extent. (I may remark here, in parenthesis, that perhaps the effects of Coca should be looked for rather in the excretions from the lungs than from the kidneys; *a priori*, we should expect that the lessening of the excretion of carbonic acid from the lungs and of that of urea, etc., from the kidneys, would be co-ordinate and correlative. They may be so, but, in the absence of proof that this is the case, we must acknowledge that it is at least doubtful. And, if it should turn out not to be so, it certainly looks as though it might be shown that Coca diminishes the excretion of carbonic acid to a remarkable degree. Certainly no known substance at all parallels its power in preventing breathlessness in elevated regions.)

3d. The use of tea in excess tends to produce a highly irritable state of the nervous system. Tea-drinkers shake and quiver under excitement, and start at the slightest noise. The Coca calms and renders placid.

4th. Tea has not one quarter of the power to sustain the body under excessive labor when it is deprived of food.

Coffee and Coca are, perhaps, more closely related, though, as was said of tea, coffee has far less power. It is to be noted that, if one unaccustomed to the use of coffee drinks a cup of it, he quickly becomes conscious of an exhilaration. This persists for two or three hours. His mental powers are stimulated, and his ideas and words

flow with increased facility, but ask him to hold his hand steadily in one position, or let him attempt some delicate surgical operation and his fingers will quiver even to the point of danger for the patient. But if, instead of coffee, he takes a cup of Coca infusion, no such excitement follows. Indeed, he would not know he had taken anything unless called upon for some unwonted effort, when he would find himself unusually competent to the task, and unfatigued by it.

The effects of tobacco are much more varied and complicated than those of tea and coffee, and comparison is therefore more difficult. We will attempt only a superficial view.

1st. The use of tobacco, both by smoking and chewing, is offensive—the former to many, the latter to every decent man. Since, however, Coca is not smoked, and the juice extracted by chewing the leaves is swallowed, these objections do not apply. The breath of the tobacco-user is offensive to everybody ; that of the Coca-chewer to but very few, and they sensitive persons who would be troubled by so faint an odor as that of tea.

2d. As to the comparative usefulness of these two substances in sustaining under exertion, the balance inclines heavily in favor of Coca.

3d. Smoking is said to promote digestion. The same, is said, by Mantegazza, to be true of drinking an infusion of Coca.

4th. Tobacco to the novice in its use is exceedingly nauseous and disagreeable. Coca is unpleasant to no one.

Wine and alcoholic liquors of all sorts prevent waste, as is evidenced by the fact that those who use them eat less food. But the evils of alcohol are numberless and need not be recounted here. He who could persuade men to substitute the use of Coca for that of intoxicating liquors would be one of the greatest benefactors the world has ever seen.

It is not a little remarkable that while no other known substance can rival Coca in its sustaining power, no other has so little apparent effect. To one pursuing the even tenor of his usual routine, the chewing of Coca gives no especial sensation. In fact the only result seems to be a negative one, viz.: an absence of the customary desire for food and sleep. It is only when some unusual demand is made upon mind or body that its influence is felt. And to this fact is to be attributed much of the incredulity of those who have carelessly experimented with it, and who, expecting some internal commotion or sensation, are disappointed.

For more than three years past the writer has used the Coca himself and prescribed it extensively for others. I need not repeat to those who hear me my experience with it in treating nervous affections, since I have lately addressed you upon that subject [*see previous essay*].

In addition to this, however, I have found for myself that, when compelled by the exigencies of my profession to forego sleep, if I chew the leaves the loss is not felt, or, if a brief nap is caught in the morning, the waking is free from the stale, exhausted feeling which used to mark those hours, and I

am as elastic and buoyant as if I had slept all night. But if I chew it freely during a day of ordinary labor, the sole result is a diminution of customary appetite. It is not a little curious that, while its use disperses the desire and need for sleep, it does not prevent sleep as do coffee and tea.

I have advised its use to a large number and variety of persons during the past three years, for various conditions, and the great majority have found benefit from its employment.

To some of these cases I will briefly refer.

A young man chewed the leaves freely during a horseback ride of forty miles in the blazing sun of Lower California. He did not dismount during the entire distance : took neither food nor drink ; and felt neither hunger nor thirst.

An eminent lecturer has, by my advice, taken a teaspoonful of the fluid extract before going upon the platform, and informs me that it very largely prevents his customary fatigue.

A lady who was so reduced in strength by uterine hæmorrhage as to be unable to walk more than a single block, took two bottles of the Coca bitters (a preparation which contains only a little alcohol in addition to the Coca) and she informs me that it enabled her to accomplish miles without fatigue.

To a sufferer from nervous dyspepsia—a lady seventy-three years of age, who had become reduced to a diet of lightly cooked meat and bread, and who for three years had not had a movement of the bowels without the aid of enemas, I pre-

scribed an infusion of the leaves. Within three days she was able to return to ordinary food, and, though two years have passed, she has not failed to have a regular and normal evacuation daily.

A lady who had for years suffered from nervous asthma, and who had been compelled to go upstairs slowly, and with frequent rests, found great relief from the very first dose of the spirits of Coca.

Other ladies who were accustomed to experience great fatigue after shopping or visiting expeditions, report a great increase of power and endurance.

I have made use of Coca for business men who are kept by the pressure of business from their noonday meal, and who, too frequently, resort to alcoholic stimulus to tide them through the rush of the day, and all testify to its sustaining power not only, but claim its superiority to alcohol, in that they experience no reaction from its primary effects.

A young business man informs me that when, as is often the case, his noonday meal is delayed for one or two hours, his sensations of faintness and hunger are at once dispersed by a mouthful of Coca leaves.

Another gives the same experience and adds that his former constipation has vanished.

A broker, who had been subjected to excessive nervous strain, and was, in consequence, unable to sleep or eat well, was becoming very weak and emaciated. He had been taking quinine and iron

at the hands of another physician without benefit, and greatly feared that he would be obliged to relinquish business for a period of entire rest. All his symptoms were immediately cured by chewing Coca leaves, and he went on with his affairs as usual.

A lady, aged fifty-five, has diabetes. Since taking a decoction of Coca with her meals she has improved wonderfully, being almost entirely relieved of her former "sinking spells," thirst, and constipation.

This case was reported to me by Dr. John Moffat, one of our elect Fellows. He has not yet reported, however, on the interesting question of the amount of sugar passed before and after the use of the Coca.

A freight clerk on the steamship Oregon, which plies between San Francisco and Oregon, writes as follows under date of April 19th, 1880: "During three days of our six in port here (San Francisco), I am on my feet from seven A.M. until ten or twelve P.M, without lunch, and, after that, am engaged in writing from one to three hours. I average only five hours of sleep. On the day of sailing I am at work at six A.M. and remain constantly at work at my freight accounts until we reach Portland. This takes from fifty-five to sixty hours. During the trip I get no sleep and eat but two meals in twenty-four hours. Still, at the close of the journey I am as fresh as ever, while my fellow clerks seem much exhausted. I attribute my endurance to the Coca leaves which I chew freely, and owe you much for the suggestion. How

long this is going to last, and not hurt me I cannot say, but so far as Coca is concerned, with me, it speaks for itself. I am sure I never could endure this life without it."

A case of paralysis agitans in a man sixty-eight years of age, which was so severe as to prevent his writing, was so benefited by the Coca that within two weeks the patient could write without a waver of the pen.

A lady had suffered for thirteen years with severe nervous headaches. They at first recurred every two weeks and finally every two days. She describes them as so violent that she would rather die than live. Three weeks after beginning the spirits of Coca she reports: "I have had but one slight attack, and I am so much stronger and better in every way that I feel sure I shall be cured."

Many instances of nervous headache, neurasthenia, and neuralgia have been reported to me as cured by the Coca, when all the usual narcotics, tonics, and anodynes had failed to afford relief.

The following letter is here introduced in full, since it not only testifies powerfully to the good effects of Coca, but also denies the existence of the bad effects which have been attributed to the free use of the leaf, and which are so well known to result from the habitual use of such narcotics as opium :—

19 BROAD ST., NEW YORK,
June 13, 1879.

MY DEAR SIR: In compliance with your request, I take great pleasure in giving you a brief

sketch of my experience during the past thirteen or fourteen months in the use of Coca leaves and preparations of the same.

About May 1st, 1878, I began the publication of a daily morning paper, the *American Exchange*. Since that time I have been compelled to take entire charge of the paper, both as editor and publisher, and consequently my duties have been extremely arduous. For more than a month after I began publishing the paper it was a common thing for me to work all night without any rest, and during one week of that time, beginning Sunday morning and ending Saturday afternoon, I had only four hours sleep, and that without going to bed. Referring to this particular time, I was not using Coca, and found it impossible to obtain any other stimulant that would keep me awake. I therefore resorted to the use of Coca, chewing the leaves and drinking the extract. I have a vivid recollection of the last night of the week mentioned, when I found it necessary to chew the leaves vigorously all night, and during the same time to take about four ounces of the extract. In this way I kept awake, attending to business on Saturday until three o'clock. I then went home, retired, and slept almost continuously between thirteen and fifteen hours. I awoke refreshed, and returned to my work without feeling any evil effects on account of the loss of sleep and the use of Coca as stated.

I have continued to use Coca at intervals since that time. I have no desire for it when I have

time to take the usual amount of rest, and never use it at such times. Occasionally, I have found it necessary to be up all night, and very frequently I am obliged to take only three or four hours' rest during the twenty-four, and I then resort to Coca with the most satisfactory results. I have not the least inclination to sleep when under its influence for the first forty-eight hours, and have no difficulty in prosecuting mental labor for that time without interruption. Unless taken in large quantities I can also go to sleep readily upon retiring and sleep soundly. In fact I recollect only one instance in which I thought Coca kept me awake when I desired to sleep. It never has an intoxicating influence upon the brain, for during its use my brain has been as clear and unclouded as at any other time.

I do not find after a year's experience that it requires a larger dose to have the desired effect now than it did when I first began to use it. Except when the system from exhaustion demands it, I never have any desire for it, as is common with habitual users of alcoholic stimulants.

My wife finds the Coca a sure preventive of nervous headache, to which she is subject, and would not be without it under any reasonable circumstances.

Yours, very truly,

L. E. THORNE.

Perhaps one of the most valuable as well as wonderful properties of Coca is the facility with

which it meets and extinguishes the craving for opium in the victims to that fearful habit. Professor Palmer, of the University of Louisville, Kentucky, has an article upon this subject in the Louisville *Medical Journal*, for 1880, and he therein narrates three cases in which he found the Coca a complete and easy substitute for the opium or morphine which had been habitually taken. One sufferer had been in the habit of taking thirty grains of morphine daily, and yet abandoned that drug wholly, and at once, and without the slightest difficulty, by resorting to the fluid extract of Coca whenever the craving attacked him.

Nor can this be considered simply an exchange of masters, since the uniform testimony of even those who have used Coca for a long time, and continuously, is that abstention from its employment is perfectly easy, and is not accompanied by any feelings of distress or uneasiness whatever.

Were Coca of no other use than this it would be a boon to afflicted humanity such as no one who has not been bound hand and foot in the slavery of opium can appreciate.

The relations of Coca to acute disease are extremely important. As a physician, I would not be without it under any consideration. How thoroughly will every physician, understand me when I say that we are not seldom compelled to stand by and witness the death of patients who are really better of the disease which destroys them than perhaps at any previous time during their sickness. We are unable to support them,

and they die from exhaustion of the vital forces. Stimulants, often, will not serve, as they quicken the pulse and increase inflammation. Even when this cannot be charged against them, they are injurious in ways which I cannot now stop to discuss. The appetite is gone, in these cases to which I refer, and food, if taken, is of little or no service. Tea and coffee do not answer the purpose except in a very limited degree, and with some drawbacks. But in Coca we have a powerful agent, whose disturbing influence over physiological processes is so little felt that it neither interferes with recovery from disease by natural course, nor with the action of remedies. And its sustaining power is so marvelous, that I prophesy that by its help we shall hereafter be able to cure many cases of disease which were otherwise hopeless.

I will narrate but one case in illustration of what I mean :

A delicate man of about sixty years, who had once had pneumonia, and who for a year had suffered from severe catarrh and catarrhal bronchitis, was struck on the chest by the pole of a truck, in Broadway, with great violence. He was attacked at once with slight hæmoptysis. On the next day he had fever, but would have no physician. Not until he had been sick for six days would he permit me to be summoned. I then found him with pneumonia of the left lung, rusty sputa, a dry, brown tongue, a pulse of 112, a temperature of 102½°, no sleep for seventy-two

hours, constant typhoid delirium, and persistent hiccough. A more hopeless case it has seldom been my lot to attempt to cure. I administered the remedies which appeared to me to be indicated, and ordered a teaspoonful of the fluid extract of Coca, mixed in a teacup of milk and water for nourishment. Of this he took about three cupfuls daily. Four days and a half later his condition was as follows: Temperature normal: tongue clean and moist: lung resolved: cough very slight, with thin, white expectoration: appetite good, sleep good, delirium gone, hiccough vanished, and, what was more remarkable to me than any thing else, his pulse, which on the day I first saw him was thready and feeble at 112, was now 72, and full and soft and regular; in short, as good a pulse as I ever felt in a man of his years.

Now this result may have been *post hoc* and not *propter hoc*, but after nearly a quarter of a century of experience, it is my deliberate opinion that no doctor, short of the Great Physician himself, could have achieved such a result within the above-named time without the aid of Coca.

I could multiply such examples, but *ex uno disce omnes*.

I am informed by my colleague, Dr. John L. Moffat, of Brooklyn, that he has had very encouraging results from the use of Coca in hay fever in four instances. Of course, its action here is antipathic, or rather, it probably acts simply by its sustaining power, and by its antipathic relations to

asthma. But even an efficient palliative, which can do no harm, will be welcomed by those who are annually visited by this plague.

It has been affirmed by some English authorities that Coca is valueless in epilepsy. For myself I can report that, in one instance of the fully fledged disease, occurring in a middle-aged lady, but in whom the paroxysms did not recur oftener than once in six months, an apparent cure has been effected by means of Coca alone. She has now passed eighteen months without a seizure. I have also more striking reports from some of the members of this society, who report very marked results in several severe cases which would yield to no other remedy. It is too early yet, however, to claim for Coca really curative powers in this terrible disease, which has so long been an *opprobrium medicorum*. Still, it is highly probable that the forms of it used by the English physicians in their trials were inert. This is rendered more than likely by the fact that one of the most expert chemists of New York city carefully searched both France and England during the summer of 1880 for good Coca, and was unable to obtain a single valuable specimen.

In view of the fact that all the drugs now ranked as antiepileptic by the allopathic school of medicine are so injurious to the general health, and in view of the results attained by myself and my colleagues, imperfect as yet though they are, I earnestly urge the faithful trial of Coca in epilepsy.

It would not be difficult to prolong the list of maladies in which Coca may prove and has proved valuable as a remedy, nor perhaps profitably to discuss its introduction into general use as a substitute for tea and coffee, and especially for chewing tobacco. I will indulge in one remark only.

That nervousness, in many forms and to a degree before unknown in any country, is being rapidly developed in this land and age, is a melancholy fact to which the eyes of American physicians are being speedily opened. Our climate is stimulating, our habits are stimulating, the struggle for existence is stimulating, and human nature is over-driven on every side. May not Coca be destined to be the grand palliative of these conditions, and the useful sustainer of exertion among our professional and business men? Contributing so marvelously to endurance both of mind and body, and doing this with certainly less injury to the system than any cognate substance known, I look to Coca as the great preserver of life and health in future generations.

From what has been said of the nature and effects of Coca it will be seen that I do not regard this plant in the light of a drug, any more, at least, than coffee, tea, or tobacco can be so termed. Nor, indeed, is it as susceptible of application as a drug as those substances even; since its effects upon the body are marked by much less disturbance than those of any of them. To be of value as a drug, a substance must have pathogenetic

power. It is, then, not as a drug that we should regard Coca, though its sphere in medical practice is destined to be a very wide, and an immensely important one. Its place is that of a food, or, if you please, supplemental or adjunct to food. Its economic uses in the community will be of a high grade, and its employment in the army, navy, and merchant marine will be still higher. It will sustain the life of many an exhausted soldier and shipwrecked sailor. Had our army at Gettysburg been supplied with it, Lee and his troops need never have been allowed to recross the Potomac. A bale of it should form part of the supply of every ship, since, in case of shipwreck, it would sustain life much longer than a corresponding amount of food.

Physiology teaches us that where there is use in the body, there is waste: where there is waste, there must be repair: for repair there must be food; and for food to become fitted for repair, there must be digestion and assimilation. All this is true, but we must go farther, and recall the fact that food never varies in its constituents. Each mouthful contains a definite, fixed, and practically invariable amount of each element contained in the food. Doubtless the normal proportion of these elements would be the proper one to furnish suitable material for repair in case we were born physiologically perfect, and then lived physiologically. But few of us are born with any approach to perfection of structure, and none of us can live physiologically. And this for two reasons:

First: We do not know all of nature's laws. And, second, we could not obey them if we did. The demands of life, civilized or savage, prevent it. Probably nature demands that we should go naked. We cannot do it. It demands a proper relation of exercise, food, and sleep. We cannot attain to it; and so on *ad infinitum*.

Now, consider the case of the sedentary man. Does he not waste his brain out of all proportion to his muscles? And is it not clear that to nourish his brain, he must eat more muscle-food than he requires? Even at the best must not his brain often go hungry? What becomes of this overplus of muscle-food? Well, two things happen. If the man's stomach is feeble it refuses to digest so much food, and he gets dyspepsia. If he does digest it, and it is absorbed, his blood is filled up with material which he cannot or does not use: his liver becomes congested; and, in ordinary parlance, he is bilious.

Now, are not dyspepsia and biliousness *the* diseases, *par excellence*, of sedentary men? And is it not true that literary men, of inactive bodily habit and abstemious as to stimulants, are great eaters? If you do not know it, you have only to ask any housewife who is accustomed to entertain the clergy—a class who avoid wine and tobacco, a part of whom only are able to take tea and coffee in sufficient amount to diminish excessive waste without rendering them nervous; and who are therefore obliged to eat hugely.

For these and all classes in the community upon whom the demands of life are similar, Coca is, in my opinion, infinitely better than wine or tobacco, even with the addition of coffee and tea. And this for reasons already given.

Only less important to the laboring classes is it, as the bulk of the muscles and other parts of the body exceeds that of the brain. An overplus of brain food is of small account to the laborer compared with the overplus of other food to the sedentary.

Fat can be stored up in the body or burnt up as fuel, and phosphorus, etc., can be easily eliminated by the kidneys. The surplus, being much smaller in this instance, can be more easily disposed of. Still, he would be a bold man who would say that the laborer is liable to no disease through the lack of a proper relation of food to his exact wants.

Now, it can be shown that tea, coffee, wine, tobacco, and, more than all, Coca, prevent waste. And not this alone, but they prevent excess of waste in parts excessively used, or called upon for an undue proportion of work. In this way they help to balance up between the needs of the system, under the strain of life, and the constant and uniform proportion of the elements of food.

Who shall measure the benefit of this effect? It is beyond all human computation.

If, then, my philosophy and physiology be correct, and if Coca is and does what is claimed, and

what I believe it will be proven to be and do, the introduction of this substance into general use is a matter of exceeding importance, and its employment should be fostered by every true physician.