Therapeutic sarcognomy : the application of sarcognomy, the science of the soul, brain and body, to the therapeutic philosophy and treatment of bodily and mental diseases by means of electricity, nervaura, medecine and hæmospasis, with a review of authors on animal magnetism and massage and presentation of new instruments for electro-therapeutics / by Joseph Rodes Buchanan.

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VOLUTION IN BIOLOGY

THERAPEUTIC SARCOGNOMY

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OF THE
BRITISH PHRENOLOGICAL SOCIETY (INC.) 1921

J Millott Severn F.B.P.S.

I send specially to
America for this work of
Dr Rhodes Buchanan.

Eulogio Prieto.
who helped him much to get his
works published, & to whom this book
is dedicated, called on me when
on a visit to London & Mr S
he twice came to see me at Brighton
On one of his visits I gave him
a phrenological delineation.

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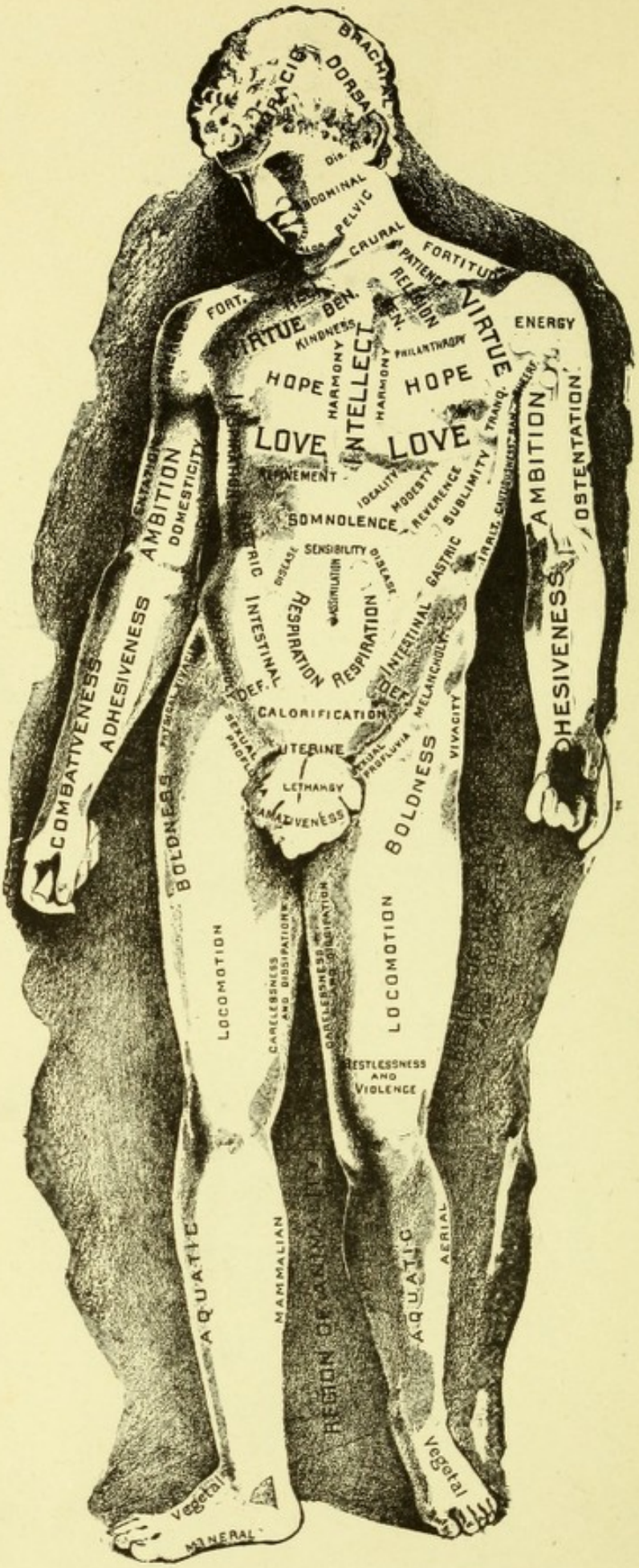
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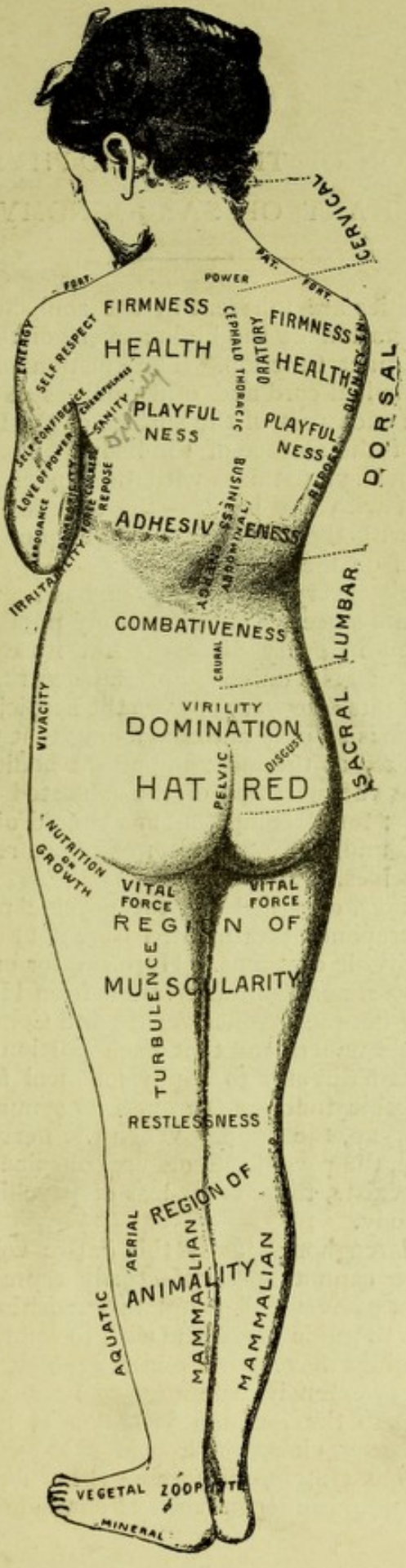
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MINERAL

EXPLANATION OF THE PSYCHO-PHYSIOLOGICAL CHART OF SARCOGNOMY.

All human faculties are inherent in the soul, and are manifested through the co-operation of the brain; every distinct portion of the brain having a distinct function. The relation of the brain to the body through the spinal cord and other nerves establishes an exact sympathy between each part of the surface of the brain and the corresponding parts of the surface of the body; thus the upper half of one corresponds and sympathizes with the upper half of the other, and the lower half with the lower — the anterior with the anterior and the posterior with the posterior. The map of the organs of the brain is reproduced on the body.

This wonderful discovery, made in 1842, has been verified in innumerable experiments since by myself and my pupils, and, being a law of nature, is verified in every disease. But its easy verification by simple experiments, and its universal presence as the law of life in disease, have not led to its discovery or even the suspicion of its existence.

Its demonstration is so easy and convincing that the science will be universally recognized as the most important addition ever made to biology, as soon as the attention of the educated is seriously given to the investigation; for all competent and candid observers will easily find what I have found, and what all my pupils readily discover in others or in themselves.

In these engravings, designed not for psychic philosophy, but for the guidance of therapeutic treatment, I have not thought it necessary to make minute psychic divisions. Heroism, for example, is not separated from Firmness, nor Approbativeness from Health, nor any subdivision introduced between Adhesiveness and Combativeness.

The reader should understand that each portion of the surface of the body is related directly to a physiological function, and only indirectly to a psychic function, through its sympathetic connection with the psychic organ, the brain. When the nervous system is very active and sensitive, the psychic effects are conspicuous; but when the opposite condition exists, there is far less of psychic effect from any operation on the body.

To appreciate Sarcognomy justly this entire volume must be perused, for a science cannot be satisfactorily represented by a map, nor is this volume a perfect and complete exposition of the subject; its chief purpose is to guide those who wish to reduce its principles to practice. Many things have been omitted which would have been introduced in a more extensive volume, and I would mention one important omission as to the location just behind Sanity, marked as Dignity in the posterior view, which is of much value as a tonic to the mind and nervous system, reinforcing the will-power, mental and physical inspiration, and independence of character.

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BY MEANS OF

Electricity, Nervaura, Medicine and Hæmospasia,

WITH A REVIEW OF AUTHORS ON ANIMAL MAGNETISM AND MASSAGE, AND PRESENTATION OF NEW INSTRUMENTS FOR ELECTRO-THERAPEUTICS.

By JOSEPH RODES BUCHANAN, M.D.,

AUTHOR OF

"SYSTEM OF ANTHROPOLOGY," "MANUAL OF PSYCHOMETRY," AND "THE NEW EDUCATION." FORMERLY DEAN OF THE FACULTY OF THE ECLECTIC MEDICAL INSTITUTE, AND PROFESSOR OF PHYSIOLOGY AND INSTITUTES OF MEDICINE IN FOUR MEDICAL COLLEGES SUCCESSIVELY FROM 1846 TO 1881.

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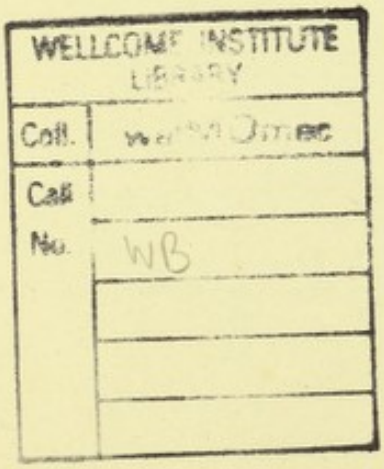

TO

MY NOBLE, WISE AND MODEST FRIEND,

UNEQUALLED AMONG MILLIONS

IN THE READY, JUST AND GENEROUS APPRECIATION

OF GREAT TRUTHS,

EULOGIO PRIETO,

OF CUBA,

This Volume is Affectionately Dedicated by

THE AUTHOR.

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THIRD EDITION. — In this edition a copious INDEX has been added, copies of which will be forwarded to those who have obtained the Second Edition.

PREFACE.

In this volume, prepared in the very limited time allowed by my engagements, I cannot claim that Therapeutic Sarcognomy is either very fully or very accurately developed. What time forbids to me will be more fully accomplished by my successors; and perhaps in future editions the necessary emendations and additions may be made.

Nevertheless, it is a fearless solution of the problem of soul and body, which lies at the foundation of all philosophy — a problem which my predecessors generally have shunned as if it were inaccessible to human intelligence, Gall and Swedenborg alone having attempted each a partial solution.

The correctness of my exposition of the triune constitution of man is sustained by the experiments which I have for many years been making in private and before classes, which my pupils have satisfactorily repeated, and it is sustained by universal experience in the history of diseases, which demonstrate according to their locality the laws of Sarcognomy. It has also a beautiful and interesting artistic illustration in the varieties of the human form, attitude, and gesture, which I hope hereafter to present. Nevertheless, in view of the history of scientific progress (which shows the ability of ignorance and falsehood to hold their ground for several generations against positive demonstration), it would be folly to anticipate a full and candid investigation of Sarcognomy by the leading authorities during the remaining years of the present century. Candid investigation of strange truths is not the habit of any nation, and is not taught in any system of education at present. The experience of Hahnemann and Beach, as well as prior reformers, shows the immense intellectual inertia of the colleges.

The scientific innovator is compelled to realize the opposition of blind conservatism as Darwin did in 1845, when he wrote: "I am a bold man to lay myself open to being thought a complete fool and a most deliberate one;" and again: "I know how much I open myself to reproach for such a conclusion, but I have at least honestly and

deliberately come to it." Yet these conclusions were reached by moving along in accordance with the general trend of scientific thought among the most advanced thinkers. But he who opposes the spirit of the age, and the authority of all the universities and eminent authors, cannot reasonably expect justice or success in his lifetime, even with a strictly demonstrable science, for habit and prejudice are, as they ever have been, much stronger than reason, and the innovator whose knowledge is revolutionary is *refused a hearing* until he has gathered a considerable and influential following. To gather such a following and win a personal triumph has not been my purpose. I am content to know that (whatever errors or inaccuracies I have fallen into) I have surely developed eternal truths and laid a basis for the philosophy that will elevate the destiny of man. Of this philosophy Sarcognomy is an important part.

As to the verity of my experiments on the brain and body on which the science of Anthropology rests for its evidence, I refer to my experiments before public audiences in New York and Boston, to the reports of many committees of investigation forty years ago, especially those of the faculty of Indiana University, the committee of Boston physicians and the New York committee of which Dr. Forry and the poet Bryant were members, and the unanimous testimony of those who have repeated my experiments wherever I have taught, including a number of eminent medical professors who have been my colleagues. The large and intelligent medical class of the Eclectic Medical Institute of 1849–50 (then the leading medical college at Cincinnati) (Prof. Warriner being chairman) expressed their conclusions as follows: "Many of us at the commencement of these series of lectures were sceptical as to the impressibility of the subject in the waking state, but we take pleasure in announcing that the remotest doubt is now dispelled. We have seen the subject deprived of muscular power; we have witnessed a great increase of his strength; we have seen any faculty of the mind brightened or subdued at pleasure; we have personally performed many of the experiments set forth in the "Journal of Man," and can testify, as can many in this city who have witnessed our experiments in private circles, that the half has not yet been published to the world." The frequent repetition of my experiments, not only in this country but in Great Britain, by the late Dr. Spencer T. Hall and many others,* in private and in

* I have not thought it necessary to describe in this volume the numerous and marvellous experiments on the brains of adults during the last forty years, but would mention another class still more convincing.

The eminent Dr. Ashburner, of London, published among accurate and well-authenticated facts the statement of his friend, A. Lidington: "I have many times

public, has given as broad a foundation as could be demanded for the verification of such discoveries, even though they constitute a complete revolution in Physiology and Psychology.

The "consensus of the competent" is the foundation on which all established sciences rest, and the competent are those only who seek the truth, and by carefully investigating a science arrive at positive and unanimous convictions. I cannot recognize those as competent who, when scientific demonstrations are made known to them, obey a thoughtless impulse or prejudice by neglecting or refusing to investigate. No matter what their standing, they cannot be recognized as competent until they have shown their competency by candid and careful investigation. The French Academy in rejecting Harvey proved itself incompetent, and professors who from prejudice neglect investigation must ever be accounted as incompetent as the ignorant mob.

On the other hand, the unanimous concurrence of all who have become well acquainted with Therapeutic Sarcognomy demonstrates its apparent scientific truth, and this concurrent sentiment of all who have attended my expositions was well expressed as follows, by the students attending the 8th session of the College of Therapeutics in Boston, in 1887 :—

"We feel that we have been very fortunate in finding so valuable a source of knowledge, whose future benefits to the human race, in many ways, cannot be briefly stated; and we would assure all who may attend this college or read the published works of Prof. Buchanan, or his monthly, the "Journal of Man," that they will, when acquainted with the subject, be ready to unite with us in appreciating and honoring the greatest addition ever made to biological and physiological sciences."

Among the competent observers may be mentioned Prof. G. W. Winterburn, who as editor of the "American Homœopathist" expressed himself as follows : "Having been cognizant of the very valuable and

excited the different phrenological organs of the brain of this child, and he has answered to each one most correctly; for instance, when I mesmerized the organ of Tune, he has declared to me that he can hear beautiful music; and so with Veneration, he has felt irresistibly impelled to pray and speak of God and heaven. I have more often operated upon little children than adults, purposely to convince the people of the truth of your science; for surely children so young, and many of whom I have never seen before, could not be guilty of any deception."

In my experiments with private classes, nearly every member of the class was usually made a subject of experiments, which was not practicable with larger audiences. The report by Drs. Ingalls, Mattson, and others on my Boston lectures in 1843, said: "Most of us witnessed many hundred experiments on at least six impressible subjects — one a gentleman and member of the class, whose intelligence and moral worth cannot be questioned."

original work accomplished by Prof. Buchanan in physiology, and having seen him demonstrate many times on persons of all grades of intellectual and physical health the truths he here affirms, the subject has lost the sense of novelty to us, and is accepted as undoubtedly proven."

This volume is therefore presented, not to introduce the subject by argument and evidence, for the evidence has long been on record, but to introduce its readers to a portion of the vast science of Anthropology, the future guide of human progress.

The knowledge of Therapeutic Sarcognomy, when widely diffused and incorporated in popular education, will bring the grand philosophy of Anthropology into familiar contact with daily life, enforcing its educational principles as to the development of character. It will give the mother and father a power of controlling their offspring in a manner heretofore unknown, by which the development of both soul and body may be gradually carried on toward perfection, freeing the soul from selfish vices, freeing the body from disease and weakness, and clarifying the mind for the recognition of truth.

In the treatment of disease it gives many suggestions arising from a new philosophy of life, many remedial measures now unknown in medical colleges, of wide application, and comprehensive methods of treatment, which upon impressible constitutions produce cures so marvellous and so speedy as to excite a stubborn scepticism among those who have been kept in ignorance of the powers of the nervous system.

There is a large class of persons, constituting a large majority in southern climates, whose constitutions can be controlled and diseases relieved by nervauric treatment with the hand. To all such a knowledge of Therapeutic Sarcognomy will constitute a protection to health and a prolongation of life.

It will guard them also by teaching them how to make a proper choice of medicines and avoid submitting to erroneous treatment, guided by their own psychometric skill.

To another large class it will furnish facilities for successful electric treatment, under their own direction. The importance of thus placing scientific treatment within the reach of all will be realized when we reflect that there are no diseases, excepting those of accidental or contagious origin, which may not be warded off in their first approaches. To teach this to mankind will abolish a large majority of their ill-health.

CHAPTER I. — INTRODUCTION.

Discovery of the cerebral functions — The grandeur of its scope and the resistance of mental inertia — A few honorable recognitions — The Medical Faculty, the Scotch Phrenologists, and the Academy of Sciences — The Eclectic movement — Position of the medical profession as expressed by Prof. Gross and others — Discovery and statement of Sarcognomy — Cerebral physiology and corporeal psychology — Practical value of Sarcognomy and character of my lectures and demonstrations — Practical certainty — Future of Sarcognomy in relation to medicine — The present volume.

In 1841 I had the good fortune to consummate six years of investigation of the cerebral functions by the discovery that the functions of the human brain, instead of being an inaccessible mystery, as they have seemed to the scientific world, were really the most accessible of all the great secrets of nature, and that a method of investigation, the very simplicity of which had caused it to be scornfully overlooked, was competent to open the citadel of life, the organ of the soul, the seat of all consciousness, all faculties and passions, the organic embodiment of that divine principle in which exist all the potentialities of the universe, and consequently the basis of all science and wisdom.

Of all subjects that have ever interested the mind of man, this is beyond all comparison the most important, whether we consider its scope and its grandeur as a philosophy, the light which it throws on all other departments of investigation, or its immediate practical utility in reorganizing, correcting, and developing therapeutics, sociology, education, religion, pneumatology, and the arts of human expression. Its scope, its power, and its grandeur in these respects cannot be adequately conceived until the sciences and the philosophies, that must result from such a discovery, shall have been developed and published, although to a clear intuitive thinker it may be apparent, as it was to David Hume, that in mastering Anthropology we conquer all science and philosophy. But few can realize this fully until they become acquainted with the vast extent of Anthropology. To many it becomes apparent when they master the first chapter of Anthropology — the science of Psychometry.

Such a discovery in science and philosophy, bringing within our

reach a larger realm of truth than all the sciences and philosophies taught in the universities, was like the discovery of Columbus, which added a new and better world to geographical knowledge and national expansion, the initial incident which marked the humble beginning of a mighty change in human destiny; and if it were not the still existing condition of the human mind to be dominated by the past — if habit and conservative INERTIA were not still, as they have ever been, the dominant forces of human existence, the authentic announcement that such a discovery had been made in the honorable and sincere cultivation of science would have commanded the attention of the civilized world, not with telegraphic speed, for telegraphs were then unknown, but as rapidly as the mail could have borne the news, and an immediate investigation by all the colleges and learned societies would have settled the question in the public mind, and made the year 1841 the most significant epoch in intellectual history — the year in which mankind added demonstrable psychic to demonstrable physical science, by which we approach nearer to the world of causes and to the elements of divine wisdom. But there were no collegiate organizations prepared or willing to look to the future, as there were none to welcome the discoveries of Galileo and of Harvey. The great ear of the literary world was still turned backward to catch the lingering echoes of the crude speculations that preceded the dawn of science, for the names of Plato and Aristotle were still revered in the universities.

It is true the announcement appearing in the "Louisville Journal" was copied throughout the United States, that my experiments on the brain were immediately repeated by Prof. Mitchell, of Jefferson Medical College, and that many repetitions of them in an imperfect manner were made before public audiences in this country and abroad, while I was myself for a few years actively engaged in presenting the subject by lectures and experiments, and challenging investigation by the scientific; but it soon became apparent that HABIT, not reason, governed the world, and that a professor of European astronomy would not be no more uninteresting and unwelcome in China, than a discoverer presenting the key to a new world of science in American colleges or scientific magazines, and I abandoned the thankless task of propagandism to confine my teaching to a college in which I addressed my own pupils.

There were, of course, some honorable recognitions of my demonstrations (see credentials of Anthropology in the Appendix), and the "Democratic Review," recognizing logically the importance of the discoveries, affirmed that all prior discoveries in physiological science shrunk into insignificance in comparison with these discoveries in the brain; but it was the only magazine, I believe, which had the logical

capacity and the manliness to make such a statement, although it would not seem to require any great intellectual capacity to understand that a discovery of the functions of the brain, which reveals the exact capacities of the soul, and the mental and physiological powers of the brain, the seat of life, the controller of all physiological functions, the centre of all physiology and psychology, must be of far greater importance than any scientific discoveries heretofore made.

I cannot speak upon such a theme in the language of diffidence and doubt, with reverence for the wisdom which governs the world (and forbids all rapid progress), for the true discoverer who has ascertained any fact is, as to that fact, an authority superior to the entire world to whom it is unknown. My discoveries of over forty years standing, often verified by others, and never refuted or seriously impeached, challenge attention still, but I present them only as a teacher to those who wish to profit by new science, without seeking to force them upon the attention of those who have no desire to enlarge their knowledge of such subjects.

It is true that in my credulous and inexperienced enthusiasm I did at first suppose that a science derived from and resting upon experiment, and eagerly courting investigation by the experimental method — a science of unequalled importance and fascination—would speedily interest the educated classes of all nations, but I was quickly undeceived. Of the medical professors in whose halls I had heard the first exposition of medical science, I found but one (and he the most learned and distinguished) who had either the interest in the subject to induce them to investigate, or the intellectual training and knowledge that would have made them fully competent. Under his auspices I sent an account of my discoveries to what I supposed to be the most competent and appreciative body in Great Britain — the gentlemen who had maintained a phrenological society at Edinburgh and published the "Phrenological Journal," and were therefore familiar with novel investigations of the brain; but my report, though authenticated by one whom they knew as a distinguished scientist (Prof. Charles Caldwell, the virtual founder of the Louisville Medical College), was too marvellous for them, and they simply filed it away (like a caveat) as a document fit to be preserved for future reference, but not fit to be published.

After the failure with the Faculty, the failure at Edinburgh, and an abortive attempt to procure a thorough investigation by the Academy of Arts and Sciences at Boston, medical journals being closed against such investigations as mine, I thought it useless to seek any further a decision by any authoritative scientific tribunal, and united with other unconquerable liberals in the medical profession to establish a liberal

system of medical education and break the unreformable intellectual despotism which had held and still holds the great mass of the medical profession. That effort was successful, and the flourishing condition of the Eclectic party in medicine, which was then organized, gives promise that in time there will be freedom of investigation in medical study, medical practice, and medical discovery.

That such discoveries as the new cerebral science which constitutes a complete Anthropology were entirely inaccessible to the mass of the medical profession under their old code, was very apparent; and that they would not, under any circumstances, be examined by the National Association which dominates over the profession in America, and therefore that it would be folly to address a memoir to them or invite an experimental investigation of the new science, I was very courteously but very distinctly informed, in a letter by the late Prof. Gross, in 1878, who was, if any one, then entitled to be recognized as the head of the profession in this country, and who, appreciating the impossibility under the code (and the unwritten code) which governs the Association, advised me to seek some scientific body *outside of the medical profession*, to investigate discoveries which belong to the sphere of medical science (of which biology is a conspicuous portion), entirely unconscious of the latent satire upon his profession which he expressed.

I was previously well aware of its truth, as a memoir upon cerebral embryology which I offered the National Scientific Association at Cincinnati in 1851 was suppressed by the intrigues of medical opponents who desired to crush the movement of medical liberalism represented by our college; and the committee of investigation appointed by the Kentucky State Medical Society at my request, in 1877, so entirely neglected their duties that they did not even hold a meeting.

Under these circumstances, the reader will not wonder that this work comes forth, as a manual for students, on my own authority, not authenticated by the medical profession or any collegiate body, excepting its support by the parent school of American Eclecticism, in which for ten years my teaching was the recognized philosophy of the Institute.

The present volume, however, is not an exposition of Anthropology, but a sketch of the therapeutic application of Sarcognomy, published in advance of its proper place in the exposition of Anthropology, to satisfy the demands of students for a text-book to aid in retaining my instructions, and to reach a great number of healing practitioners who need an exposition of the science which makes manual healing a scientific art.

This application of my discoveries arises from the fact that in 1842

my discovery of the cerebral functions was completed by the discovery of the sympathetic relations of the brain and the body, in consequence of which, the functional operations of the brain, which when confined within the cranium are purely psychic, become, when transferred to the body by the laws of sympathy and the laws of functional operation, physiological in their effects, and also, by the inevitable manner in which they use the body for their purposes in voluntary acts, produce the same effects which result directly from the laws of sympathy — a wonderful illustration of the ingenuity and divine wisdom of the plan of the human constitution.

But the reactive effect of the same law renders operations which are purely physiological in the body, such as circulation, digestion, or muscular action, in their reflex influence on the brain, disturbing or modifying influences of psychic life. That such reflex influence is continually in progress, we readily perceive when we think of the effects on the brain and mind of an excessive dinner, a glass of brandy, or a copious inhalation of pure air; and a vast array of mental symptoms accompanying diseases of various organs, which have been observed especially by homœopathic physicians, carries us still further into a recognition of the special influences each portion of the body exerts, in its irritated or inflamed conditions, upon the state of the mind.

Thus we have, by rational necessity, a science of cerebral physiology, or physiological influences of the brain, and, on the other hand, a science of corporeal psychology, or influence of the body upon the brain and mind. In all of which we understand that these inverted or reflex sciences, cerebral physiology and corporeal psychology, are partly sciences of sympathetic association and reflex influence, and partly sciences of functional action, as the vital forces in the brain act directly upon their subordinate apparatus in the body, and the organs of the body in their functional action directly influence the brain, by means of nervous connection, and by their influence upon the blood, which, as it passes through the body, receives and carries along the influence and modification produced by each organ. In addition to which, each organ in the brain or body is compelled for its own efficiency to use its correspondent organ, as Combativeness uses the muscles and heart, and as the vigorous muscular and cardiac action rouses the combative spirit — or as the perceptive organs use the eye, and the eye, in its visual action, rouses the perceptive faculties.

Thus, we have a science of cerebral and corporeal correspondence and association, which, above, is CEREBRAL PHYSIOLOGY, and below, a compound science of corporeal psychology and physiology combined,

which I have called SARCOGNOMY; the primitive effect of any excitement in the body being physiological, and the secondary psychological.

It is this primitive physiological effect to which this volume will be mostly devoted, for Sarcognomy embraces not only the discovery of the sympathetic psychic effects, but the still more important principle that *each vital function of the body and the soul is expressed at the surface of the brain and of the body*, and that for every function there is an external locality at which it may be reached, and stimulated or tranquillized by nervauric methods, by electricity, or by heat, cold, and medical applications.

How very important it is, then, that those who treat human diseases by the application of the hand or by electricity should know the influence of each portion of the surface, and of the currents passed through the body from one locality to another, since these vital forces which have been discovered, and which are controlled by the hand (and the battery), are not merely specific and limited influences for each organ, but are also *general influences for the brain and body*, productive of general conditions, as, for example, the influences at the shoulder, which are universally tonic, and restorative to mind and body, the irritations of the abdominal viscera, which are peculiarly exhaustive and depressing, and the pelvic irritations, which derange the nervous system. The influence of the electric HYGIENIC CURRENT animates every function of life, and every current through the body produces specific physiological and psychic effects. This gives us an entirely new conception of the vital forces of the human constitution.

The principles of Sarcognomy were very briefly presented in my system of Anthropology thirty-five years ago, but without the fullness of directions necessary to guide the medical practitioner in its application. When I resumed medical instruction in 1877, I began to teach classes the manual treatment of disease according to the principles of Sarcognomy, giving some hints also as to the collateral use of electricity; and in the College of Therapeutics at Boston I have given a complete exposition of manual and electric treatment. But experience has convinced me of the absolute necessity of a manual for habitual guidance of the practitioner in a matter so entirely foreign to the education and habits of society.

My lectures have been invariably accompanied by practical demonstration of the truth of all that was taught; the majority of the classes have been sufficiently sensitive to feel, recognize, and describe the influence of every function described by Sarcognomy, often throwing new light upon the subject by the peculiar manner in which each one was affected.

As a method of healing, Therapeutic Sarcognomy was regularly illustrated upon the members of the classes by treatment of their own infirmities, pains, or diseases, as a demonstration of the value of the methods and a part of the instruction. There was no more hesitation or doubt than in the collegiate lectures which present and illustrate the experimental science of chemistry, nor will there be any difficulty or hesitation among those who read this volume, and, entering into the spirit of the subject, engage in the experimental demonstrations which would make them practically familiar with the subject, in the manner that I have recommended. Students who are now healing diseases upon the principles of Sarcognomy find their faith and zeal continually increasing by the results of practice. But I presume the result may be different with those who approach the subject in a spirit of antagonistic scepticism, and, without proper experimental inquiry, attempt to form opinions by *a priori* speculations upon the basis of their knowledge of other subjects and their ignorance of this. Perchance there may be reviewers, too, who would rather assail than investigate, and who do not feel that practical ignorance of any subject is any disqualification for instructing the public. This volume was not written for that class, but for sincere seekers of scientific truth who have sufficient sincerity and rationality to recognize the same qualities in the author, and to believe that a system of science which has been cordially accepted by all who have become well acquainted with it is worthy of patient study.

I might have introduced a long array of the unanimous testimony of those who have felt the truth of Sarcognomy in their own persons and of those who have been healed upon its principles; but such is not the custom of scientific teachers. We state the truths that exist in nature; we state what we have found, and we show others how to find the same.

That which I have taught as to the constitution of man, which I have illustrated in thousands of experiments upon others, is also to me a matter of personal knowledge. I feel the influence of many localized functions described in Sarcognomy, and I can speak of them with confidence as I could say that I see with my eyes or hear with my ears, and hence I do not feel like arguing upon such subjects or adducing any testimony as to truths which are so familiar.

Yet, although I do not consider such testimonials necessary in this volume, I am not indifferent to the expressions of those who honorably and sincerely study the laws of nature in the same spirit as myself, and who by their observations may throw additional light upon the laws and phenomena which I have so briefly stated. I would therefore earnestly invite the correspondence of those who

undertake to investigate and practice in this new department and to cultivate a science which time has not permitted me to elaborate to the perfection in which it may be enjoyed by posterity.

I shall respond with equal pleasure whether my correspondent shall enumerate his triumphs or state his difficulties; whether he desires additional information or contributes facts and discoveries made by himself in the boundless field of Sarcognomy and Therapeutics.

The period of life at which I have arrived does not permit me to anticipate witnessing the future triumphs of Sarcognomy and its revolutionary influence on medical science, or the new aspects its therapeutics may assume under scientific cultivation, and I am, therefore, more desirous of communicating with those who become my co-laborers in this science, of which this volume is a partial exposition only. In another volume I propose to show the existing status of Electric Therapeutics, and the fundamental changes in its practice and principles which are made by Sarcognomy, as well as the new apparatus by which I hope to enlarge its powers and render it more worthy of general use by medical practitioners and manual healers. With or without the aid of electricity Sarcognomy must become a very IMPORTANT ELEMENT IN POPULAR HYGIENE AND EDUCATION — a grand agency for the prevention of disease and development of health.

In the higher civilization of the approaching century a knowledge of the constitution and laws of the soul, brain, and body, which constitutes the only philosophic basis of hygiene, therapeutics, education, religion, and sociology, will become the most important acquisition of a liberal education, and will be considered a necessary element in the EDUCATION OF ALL.

It is well, before offering the specific therapeutics of this volume, to glance at the entire scope of the Therapeutics to be developed by Sarcognomy. If the healing art is based upon the true science of life, and if (as will be shown) life is an enduring spiritual power, in a being of wonderfully complex constitution and capacities, which organizes the human form into a complete expression of itself and of every faculty of its complex existence (designed to act on matter here and in a spiritual world hereafter) — each faculty having a double purpose, spiritual and material, and having a specific structure for manifestation in the brain and in the body — and if these vital powers (their localities being shown by Sarcognomy) can be reached, stimulated, strengthened, and modified by other means than drugs, with a precision never before known, may not this new therapeutics largely supersede the drugging method by virtue of its simplicity and safety? To what extent this can be done must be shown by the students of Sarcognomy.

To a large class, at present, the vital nervaura has proved sufficiently potent to make medicines unnecessary, but to a still larger class, in the temperate zones, it is not sufficient, and cannot be substituted for the cheaper agency of medicine to any great extent. For that larger class, however, we have the irresistible agencies of electricity and caloric, the application of which needs only the guidance of Sarcognomy to which this volume is devoted. With such agencies at command, enthusiasts may exclaim, "Throw physic to the dogs;" but medical remedies are too potent, too convenient and economical, to be discarded by *those who understand their value.* Nor can they be very extensively discarded to introduce the use of electricity, until its application shall have been perfected by Sarcognomy, and until by apparatus different from any now in use it shall have been made more genial, safe, and curative. The new methods of Psychometry and Sarcognomy will give to society that thorough undertanding of remedies which will render their use safe, and removes one of the great evils of the old-fashioned practice.

In this volume, the nervauric method, which uses the human hand, will be fully presented, with the anatomical and physiological bases of Sarcognomy, and with incidental instruction in the use of electricity. The numerous illustrations of Sarcognomy in the principal diseases will be briefly stated, the important psychic laws of therapeutics will be explained, the mechanical methods of controlling the circulation illustrated, and the processes of Animal Magnetism, Massage, and Psychic Healing reviewed.

BOSTON, 1889.

CHAPTER II.

OF LIFE AS A SPIRITUAL POWER, AND ITS LOCATION IN THE BRAIN.

Ancient medical philosophy spiritual or vital — Des Cartes the apostle of modern scepticism — His visionary dogmatism — Prof. Huxley a follower — Medical scepticism criticised by Dr. Lionel Beale — Living structures confound materialism — Unfairness and intolerance of medical dogmatism — Its repudiation by Dr. Reynolds — The unproved hypotheses of scientists — Physiological statements of Prof. Bennett and absurd theory — Phenomena of living bodies described by Dr. Beale — Phenomena of amœbæ and white globules of the blood — Prof. Ranvier's statements — Phenomena of bacteria and vibriones — Ciliary movements illustrated — Movements of hydra — Life in simple microscopic structures — Vegetable life similar to animal — Illustrative examples — Haeckel's wild hypothesis of spontaneous generation — Huxley's admission that abiogenesis never occurs — The example of Monera refutes materialism — Bastian's description of amœbæ and evasion of the issue — No anatomical difference to explain different vital endowments in nerves — Vitality an independent and permanent existence which should be honestly recognized — Total failure of the fashionable physiology to explain muscular motion by caloric — Exposition of this absurdity — Fallacious ideas of the action of the brain and its influence on health — Fallacies in education — Chemical constitution of living matter — Brain matter different from Huxley's protoplasm — Oxygen a necessary element — Bioplasm cannot be chemically produced — Nervous influx indispensable to life — Life dependent on nervous centres and nuclei — Comes from the nervous system and leaves from the brain — Death from below upwards, as shown by Bernard — More important to energize the brain and soul than to cultivate the body — Effect of dark or watery blood on the brain — Effect of pressure — Effect of shower bath on head, and of ablation of the upper surface of the brain — Influx not exclusively to the brain but also to the ganglia — Transference of senses to the epigastric region, and co-operation of central regions of the body with the brain — Influence of oxygen similar to a spiritual atmosphere — Influence of solar plexus, pineal gland, and cardiac plexuses and ganglia — Cerebro-spinal system primitive seat of life — Development of the human embryo — Report of M. Gasparin on Belgian miners — Cerebral stimulants a substitute for food — Something more than chemical elements necessary — Spiritual causes equally important — Life arrested when transmission from brain is interrupted.

Effect of injuries of the spinal cord — Fatality from severe laceration — Pathological effects of spinal injuries — Effects on the heart — Analogy to typhoid fever — Effects of injury of the brain — Typhus fever and cerebral disease — Effects of wounds of the brain — Bichat's experiments on the brain in dogs — Majendie's injection of water — Great quantity of blood in the brain — Effects of injuries of nerves — Fallacy of Claude Bernard — Wasting of the muscles from lack of nervous influence — The ganglionic system dependent on the cerebro-spinal — Brain controls both voluntary and involuntary processes.

THE medical philosophy of to-day is low in the trough between the great waves of thought which once touched the higher realms of being, and will again in its reaction from a downward career.

The old medical philosophy which exclusively ruled the world until the 17th century, recognized the spirit or pneuma as the basis or essence of vitality.* Van Helmont, Stahl, Harvey, Hunter, Cuvier, and Bichat were vitalists, recognizing the vital force as distinct from and superior to the chemical forces which were subordinate and antagonistic to vitality.

Des Cartes (1596-1650), the apostle of Scepticism, led the way in that style of dogmatic denial, inspired by the combative animal nature, which has done so much for the limitation of human knowledge and the diffusion of falsehood; for dogmatism is not merely agnostic and sceptical — not content with simply ignoring principles or truths that are great and wonderful, but associated with a self-sufficiency which prompts to the arrogant presentation of *a priori* hypotheses, often of the most absurd nature, to sustain its own contracted views, which originate in the rejection of evidence and neglect of observation. His astronomical system of vortices was but a crude speculation, which was set aside by the scientific researches of Newton. Equally visionary were his conceptions of the human constitution as a physical body operating wholly by physical laws, but giving lodgment to a soul in the pineal gland, which was simply a spectator, having no action upon the body and receiving no influence from it — a baseless notion, more fully developed afterward by Leibnitz. The speculative dogmatism of Des Cartes has commended him to the admiration of the famous modern sceptic, Prof. Huxley, who has revamped the other insane notion of Des Cartes, that animals are mere machines, operating without consciousness or thought, as a clock or any other physical apparatus — a very logical inference from materialism.

The Cartesian spirit of dogmatism, limiting the mind to the conception of physical facts, has taken possession of the medical profession, and Dr. Lionel Beale well says:—

"The disciples of the new philosophy insist that there is but one force or power in nature, that the sun is the source of that force, and forms livers, hearts, lungs and brains; and that every living thing is formed by him; that, in the language of Bence Jones — 'The one law of the union of force and matter, and of the conservation of energy, obtains throughout the organic as well as the inorganic crea-

* Van Helmont located the soul in the epigastric region, because he supposed the brain had no circulation of blood.

tion.'* I feel quite sure that if the physicists who make these confident assertions could condescend to study the phenomena of very simple living things, they could very soon discover that they had no case at all. Physico-chemical dogmatizing of this kind has been going on for twenty years. It has done nothing towards unravelling the mysteries of life which meet an honest student of nature at every turn, and it has led a number of idle people to believe that we really know a great deal more than we do know."

The "simple living things" which confound materialism are seen in every living structure. Such structures are built up by a structureless, transparent jelly, called protoplasm, or more properly bioplasm, which is the seat of life, and is self-moving with motions for which no scientist has ever discovered any other cause than vitality — with a power of assimilating and vitalizing dead matter, and a power of organizing structures for the formation of which no reason can be given except that their formation is the result of the vitality which maintains the mysterious motions of the bioplasm.

Medical dogmatism is not philosophic; it is not a faithful seeker of facts, but rejects or stubbornly evades those which might give deeper philosophic views, and seems to hold that any fact contradicting materialistic theories may be ignored entirely, or may be discarded on any frivolous pretext, and that any author who records such facts should be suppressed or ignored. Hence a large amount of most valuable scientific literature is entirely *unknown* to the pupils of the colleges, and this ignorance is firmly maintained; for the physician is ostracised or scoffed at, and the professor ejected from every honorable position, who treats all facts with fairness and makes no secret of his convictions. Yet all are not governed by this absolute materialism. Dr. Reynolds, in the address on medicine delivered in 1874 before the British Medical Association, said: "Physical force may be compared to vital acts, but life itself is the special property

* "Dr. Tyndall teaches people that the sun "*forms*" muscle and "*builds*" the brain, and yet omits to tell them that such very rough and simple pieces of mechanism, comparatively speaking, as water-mills and wind-mills and clocks and watches are really formed and built by the sun. This omission requires an explanation upon his part, for it must be obvious even to a child that if the sun can *form* a muscle, and *build* a brain, it ought to be able to perform such comparatively simple operations as raising a wall or building a house or making a wheel. Still Dr. Tyndall does not say that walls and houses and clocks are the *workmanship* of the sun, though he has nevertheless affirmed, without explaining what he means by the phrase, that lilies and verdure and cattle are the sun's workmanship." — (Beale on Protoplasm, or Matter and Life.)

This idea of Tyndall does not differ much from the theory of Carpenter that caloric, by *transformation* into vitality, produces the vital phenomena. Writers who ignore life cannot avoid falling into some absurdity.

or the condition of the special material which effects that peculiar relation, and it is as far from comprehension now as a thousand years ago." To the suggestion that by further experimentation we may get rid of the term and the idea of life itself, and so make a great advance in science, he says: "I believe it will not be done, but that there will ever remain the same kind of mystery with regard to life itself . . . that still shrouds the nature of the simpler forces, such, for instance, as gravitation or heat." "The view that is taken of the correlation of vital and physical forces, when it assumes the form that I have mentioned, is, I think, mischievous in therapeutics." He refers especially to the abuse of electricity, which "has again and again been used when it could by no possibility have been productive of the slightest advantage, and when the production of such enforced action of muscle and nerve has but diminished the strength and exhausted both the energies and the endurance of those who had not one grain of either of those qualities to spare." What was needed, he says, was the "conservation of the central nutrition, and a consequent addition to the stock of vital force," not "Faradization, alcohol, or strychnia."

Alas, if the whole tale could be told of the destruction of health and life by false and narrow medical theories, it would rival the horrors of war.

The fact that chemical manipulation cannot produce the most highly organized substances and structures which are developed in human bodies, does not embarrass the anti-vital colleges, for they can hold on to their *unproved hypothesis* a thousand years, and if at the end of that time they shall have produced the greater portion of those substances by chemical methods, they will be still as far off as ever, for they will be unable to make any of their substances act as living bodies do, and it will still be as apparent as ever that life comes only from life, and never from mere organization. But it will not require a thousand years to improve the brain development sufficiently to enable men to investigate in a candid spirit, and give due weight to facts a thousand times demonstrated. Prof. John Hughes Bennett gives the following interesting illustrations of vitality: "Other movements which are unquestionably vital occur in the molecules of the yolk, on the entrance into the ovum of the spermatozoid. Here it *cannot be maintained* that the results are purely physical, because in different ova we see such widely varying effects from apparently the same cause. Neither can it be attributed to any direct influence of the cell, or of its nucleus — the germinal vesicle. For example, an egg is fully maturated in the female organs of generation, and would prove abortive if a spermatozoid did not find its way through

the zona-pellucida, and get amongst the molecules of the yolk. As soon as it does so, the apparently purposeless Brunonian movements receive a new impulse and direction. Both spermatozoid and germinal vesicle are dissolved among them, and wonderful phenomenon of the division of the yolk takes place, not by cleavage or other action of the cell-wall or nucleus, but by the separation of the mass into two masses instead of one. The nature of the phenomenon in this case may be compared to what is observable in a dense crowd of men called upon to pass over to the right or left hand in order to settle any disputed question by a majority. At first unusual confusion is communicated to the whole — some hurry in one direction, others in another ; but after a time is seen at the margins, where the crowd is least dense, a clear space, which gradually approaches the centre, and at length bisecting the whole, produces a complete segregation of the crowd into two portions. So with the molecules of the yolk in the egg after impregnation. Their movements are directed by conditions which did not previously exist, and a stimulus is imparted to them which causes the peculiar result. It is the division and subdivision of the yolk, wholly or in part, which produces the germinal mass out of which the embryo is formed, and this not by any direct influence of the cell or nucleus, but in consequence of a power inherent in the molecules themselves, which was communicated to them for a specific purpose."

And yet this same Professor J. H. Bennett who has given this clear description of vital operations stultifies himself by surrendering to the doctrine that life is "but a condition of matter" — ay, the eloquence of a Demosthenes or the poetry of Milton is "but a condition of matter."

How much more philosophically does Dr. Lionel Beale treat the subject as follows: "Although plants and animals have been oftentimes compared with machines, no one has yet taught exactly in what particulars any plant or animal is like any machine. For my part I cannot discover the slightest resemblance in origin, form, composition or mode of action. I have looked over and over again at the matter of the living plant and animal in which and by which the wonderful changes characteristic of it are effected in health and in disease, but I have seen nothing save a little transparent, structureless, colorless, semi-fluid stuff. I even see this move. While under my observation various substances of complex chemical composition may be formed through its agency, but the highest magnifying powers do not enable me to form any conception concerning *how* this is done. The living matter may increase in size, and I may see it divide and subdivide so as to give rise to other masses like itself. But

how it moves, how it grows, how it forms, and how or why it divides, I cannot tell. I know, however, it does not move like any mechanism of which we have any experience, for it moves in any and every direction, and every minute portion exhibits movements of its own accord, not from being pushed or pulled by others. There is no machine that moves of its own accord in any part. The parts of a machine *are moved.* The living matter does *not grow* like a crystal, for the stuff of which it is made cannot be detected in the solution around it, nor is the matter deposited particle after particle upon the surface." "There is, as I have shown, a great distinction between the *inanimate granules* or *molecules* which may be *precipitated* from fluids and the *living molecules* which *spring from pre-existing molecules.* I have adduced reasons for believing that *living, independent organisms* exist, which are so small as not to be visible by the highest power until they have lived for some time and grown."

"A number of minute *living particles* being suspended in fluid never run together and form collections. So far from aggregating together, *they divide and subdivide* and *multiply enormously in number.* Inanimate particles, on the other hand, always become aggregated together or coalesce to form larger masses. Under no circumstances known do living particles become aggregated to form a compound living mass, but each absorbs nutrient matter and divides into smaller masses. Indeed, living particles multiply in number, *emanating from, instead of collecting towards, centres.*"

There are numerous phenomena in every animal body which are entirely distinct from the operation of physical forces, and which to a clear intuitive mind are an instantaneous demonstration of a controlling power utterly different from mechanical and chemical energies. The incessant locomotion and change of form occurring in amœbæ and in the white globules of the blood cannot be explained mechanically. These white globules (which in man vary from one fiftieth to one five-hundredth of the red, in number, show continual changes on their surface, putting out or withdrawing a small portion of their exterior, like living amœbæ, until after a few hours this vital property disappears and they remain spherical and at rest. Professor Huxley describes them as "creeping about as if they were independent organisms." Professor Ranvier, in his Lectures in the College of France says: "In studying the amœbæ, white globules of the blood, and the lymphatic cells (organic equivalents of the nervous system) we have stated that their movements, styled amœboid, are not produced by accident or at random. The prolonging of their substance in their movements shows itself at the points where the cellules are subjected to some irritation. The cell is then sensible, and its sensi-

bility excited acts on its mass, which responds by a movement. The amœboid cell is then an element at once nervous and muscular, but its sensibility and mobility are not localized; they do not depend upon any organic differentiation according to the precise expression of naturalists. This differentiation *begins* among beings a little more complex — such, for example, as the polypi." The white corpuscle thus has the character of a minute animal or animalcule, and, according to one microscopic observer, reproduces itself abundantly by discharging successively the nuclei in its interior, which go forth independently originating new corpuscles.

Unaccountable are the movements, continually in progress, of the granules in the interior of the white corpuscles, which continue after the white corpuscle has been dissolved and its contents have escaped. Nor is there any physical explanation of the movements of bacteria and vibriones which originate when animal matter is undergoing decomposition in fluids. Still more mysterious are the strange movements of conception when the male and female elements unite in forming the embryo. The materialist looks at this, and instead of drawing the most obvious and natural inference, and recognizing the presence of life-force, substitutes the *hypothesis* that in some future age we shall discover the *physical* causes which he *supposes* to be the agents, *without any scientific basis for his opinion.*

The origination of bacteria and vibriones in fluids from matter once vitalized as vegetable or animal substance (independent of the atmospheric germs for which M. Pasteur contends so firmly) would give no substantial aid to the hypothesis of the materialist. It would simply prove that life is capable of entering into very close union with certain albuminous substances, so close as to remain in combination after the substance is separated from the body in which it was produced, in which it worked in combination with the general vitality. There is no vital chemistry to explain this combination of organized matter with vitality except that which I have derived from Psychometry. That the globules of blood and of milk, separated from the body to which they belong, originate new forms of life, as bacteria, vibriones, or the mildew on milk, is well known; and it has also been observed that the general vitality does not always control these subordinate growths, as some species of bacteria have been observed in the fluids of various plants, such as the Apocynum Cannabinum (Indian hemp), Asclepias Cornuti (milk-weed), and Sambucus Canadensis (elder), which are supposed to be transformed starch globules. Bacteria and fungi have been found in the interior of the brain, of the liver, in hepatic cells, epithelium cells, membranes and other parts of dead animal bodies or parts of living bodies undergoing decay. They

have also been found in eggs. Their occurrence in the living body, circulating in the blood (as I have found in certain patients), is simply an evidence of the failure of the general vitality to control subordinate parts, allowing abnormal action to take place, as occurs in fever, inflammation, and gangrene, when vitality is injured and unable to control the fluids of the body, which continually tend by their chemical properties toward decomposition, in which new forms arise; for which reason antiseptics give great assistance to vitality in fevers, in controlling the fatal septic tendency of animal compounds. The bisulphites of lime and soda, by their great antiseptic power, counteract the degenerations of fever and the tendency to evolution of bacteria.

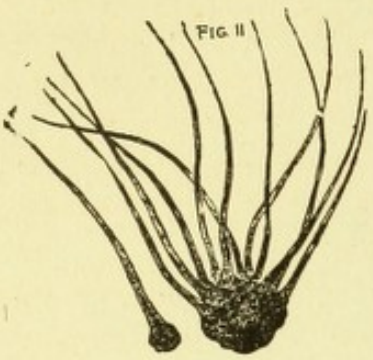
The foregoing facts show that structures occupied by vitality have the power of organizing and vitalizing matter of which they take possession, imparting thereto vital powers which may be retained after disconnection from the vitalizing structure. This is also signally displayed in the ciliary movements which prevail so extensively throughout the animal kingdom (except among the Articulata). The moving cilia are almost always present on the mucous and serous membranes, especially of the digestive and respiratory passages, and are sometimes found on external surfaces. These cilia, varying in length from 1-1000 to 1-12000 of an inch, are in continual motion, waving like a field of wheat in a breeze, at an average rate of about 200 to 700 vibrations a minute — a movement as completely inexplicable and apparently spontaneous or causeless as those of the amœbæ — a movement which propels the fluids in which they wave.

The still more marvellous fact concerning the cilia is that they retain these vital motions when detached from the animal to which they belong, or after its death. A piece of epitheliun scraped from the throat of a living frog will continue for many hours, if kept moist, to show these motions of the cilia. It has been observed for seventeen hours. The continuance of the ciliary motions after death has been observed as long as sixteen days in a turtle, after death by decapitation. In the higher animals, however, it generally ceases on the second day, in accordance with the general law that as organization advances to a higher grade, life is more concentrated in the headquarters of the nervous system, and less identified or connected with lower structures.

When through a microscope we observe the cilia in motion, we feel that we are in the presence of a mystery for which no physical laws give any explanation, and upon which physiologists have thrown little light. It is an arbitrary, mysterious fact, that as gravity unaccountably draws bodies into aggregate masses, life unaccountably draws

atoms into organic forms, and then gives them most mysterious motions.

Dr. Beale offers the only explanation of ciliary motion by showing that the cilia are fine tubes occupied by an extension of the bioplasm which is found at their base. This, however, only shows that the mystery consists in the action of the bioplasm that impels the ciliary motion. Spontaneous action is the mystery of life.



A few cilia from the frog's tongue, showing their connection with the bioplasm, which can be traced into each cilium; magnified 1400 diameters.

Bennett confesses that their movement "*must depend on an inherent power, the nature of which is essentially vital,*" and "they are clear and structureless."

Beale gives the annexed view of cilia from a frog's tongue magnified 1400 times.

Where life exists, it needs not the organs to which we are accustomed to refer it. It works in a simple jelly; and in the hydra locomotion is effected by its members, in which we can find no trace of either a muscular or nervous system.

Hence it is evident that all the powers of life which in man are so grand and complex can exist in a rudimental stage in any bioplasm, and from that bioplasm elaborate structures of a higher type.

The phenomena of life extend from its ample development in man, all the way through the animal and vegetable kingdoms, to the border of the mineral, and its essential nature is everywhere the same, varying only in degree. It has everywhere a sensibility or receptivity for impressions, and a reactive power, a vital force, tending downward, and a spiritual, sustaining, reproductive force, tending upward, manifesting itself in the conservation of the species and in forms more or less beautiful — conditions more or less beneficent. Minute insect brains have a psychology as complex as that of the whale.

The simple cells of animal life, consisting of protoplasm and nucleus, still retain a psychic capacity by which they select and appropriate their food. The *Vampyrella Spirogyræ*, consisting merely of protoplasm and nucleus, attacks the Spirogyra only, for food; and the simple cellule, the *Monas amyli*, feeds only on grains of starch. According to our most recent authority, A. Binet, the minute cellular beings revealed by the microscope all have a "complex psychology." "Psychic life" (he says) "like its substratum, living matter, is, when closely studied, an exceedingly complex subject. This fact is with me a profound conviction; it rests, not upon abstract ideas and methods, but upon the observations that I have given, — observations

that are not founded upon my own personal authority alone, but which are drawn from the highest authorities, and most of which I have been able to verify with my own eyes."

To perceive what is near us, to pursue and attain what is desired, avoiding what is not desired, to exercise the necessary perseverance, and suspend action when there is no motive, or increase its vigor as required, — such are the psychic elements that belong to the simplest animal structures revealed by the microscope. They are never reduced to simple irritability.

If this occurs anywhere it must be in the vegetable kingdom, but even there vitality manifests itself in a rationally or properly directed impulse and action which cannot be explained by chemistry or physics. There is a feeble remnant of that intelligence which recognizes the situation, and that volitionary impulse which acts according to circumstances. When the radicle and plumule of a bean appear, why does the radicle always turn down, whatever its position, and the plumule turn up; and when roots grow down in the ground is not their ability to find their way something that resembles intelligence.

Darwin says: "It is hardly an exaggeration to say that the life of the radicle, endowed as it is with such diverse kinds of sensitiveness, acts like the brain of animals."

To the modern student (says Arthur Smith in the "National Review"), "the plant is no longer an inanimate being, but stands revealed as an organism exhibiting animal functions, such as breathing, circulation of the blood or sap, various complex movements, and sleeping, which are as certainly equally well defined as are the analogous traits in the existence of the animal."

"All those who have studied the habits of plants know full well that they have the power of adapting themselves to circumstances, and have many movements and traits that are the very reverse of automatic. Numerous instances might be pointed out in which not only are the signs of sensibility as fully developed in the plant as in the animal, but many phases of animal life are exactly imitated. Take, for example, those wonderful plants, the Mimosæ, sensitive to the most delicate touch. It folds itself at the close of day, and there is no doubt, if it were not allowed to sleep it would like ourselves soon die. This is not only an example of the necessity of sleep for the regaining of nervous energy and recuperation of brain power, but a proof of the existence of the same in the vegetable kingdom. Then there are the carnivorous plants, the Venus fly-trap (Dionæa), for instance, which will digest raw beef as readily as its insect prey. A still more remarkable instance of intelligent plant movement is found in one of the lowest forms of the vegetable kingdom, *Pteronospora*

infestans, the well-known potato fungus. When the spore cases burst a multitude of little bodies escape; if these bodies gain access to water they develop a couple of curious little tails, and by means of these tails they swim about after the manner of tadpoles."

To ignore the existence of vital power as a peculiar self-guiding energy in all living growing beings, seems like a stolid suspension of our reasoning faculties. Nor is it at all unreasonable to believe that this vital power, after its separation from matter, may continue to exist in a different sphere in accordance with the doctrine of the indestructibility of force.

That there is something in plant life correlative with humanity is shown in the admiration and love that are given to flowers and trees and the actual worship of flowers by some Persians. That human vitality can in some cases materially aid the growth of plants is an opinion that some profess to base on experience, but has not been tested by scientific investigation.

To deny the existence of life power as something distinct from matter, is to assume that matter may come together and originate life by its accidental grouping. But this has been sought in vain; and Hæckel has been driven to rely upon the Monera or Amœba, in which the marvellous properties of life are manifested by an apparently homogeneous speck of gelatinous matter, as the "*primeval parent of life on the earth.*" This example he considers of "the very greatest importance to the hypothesis of spontaneous generation;" but his example proves nothing, except that he can, as he says, "easily *imagine* their origin by spontaneous generation;" and he must also *imagine* a miraculous transformation of the lower into the higher order of animal life, proceeding through countless ages without leaving any record; so that his theory at last is but an affair of imagination, like the vortices of Des Cartes. If this "semifluid, formless, and simple lump of albumen," as he describes it, is "the primeval parent of all other organisms," why does not a formless and simple drop of albumen from an egg or from the coagulable lymph of the blood manifest the same active life and again act as "the primeval parent of all other organisms?" Why do we never see an example of the spontaneous origin of vital protoplasm and its progress as a primeval parent into "all other organisms"? Such things never occur in nature, and even Prof. Huxley, the champion dogmatist of materialistic writers, said in his article in the third volume of the "Encyclopædia Britannica:" "Of the causes which have led to the origination of living matter it may be said that we know absolutely nothing;" and again: "The fact is that at the present moment there is not a shadow of trustworthy direct evidence that abiogenesis does

take place or has taken place within the period during which the existence of life on the globe is recorded."

The example of the Monera, instead of helping the materialist, is really one of the best evidences of the futility of their hypothesis, as it shows that vitality is competent to display its powers in an organization of the simplest character, while a structure apparently the same, without the vitality, simply goes into decomposition. The vital power displayed by the amœbæ are not explicable by any complexity of organization. "The amœba," says Bastian, "is forever changing its form. It is composed of a clear, jelly-like material, endowed with a superabundance of that intrinsic activity characteristic of animal life generally. Those internal molecular movements, indeed, which are inferred to occur to a marked extent in all living matter, seem to take place in it in a pre-eminent degree. Its whole substance shows a mobility of the most striking kind. It continually moves through the water or over surfaces, by alternate projections and retractions of its active body-substance." Thus, without visible muscles it moves, and without a digestive apparatus it takes and digests food, taking it at any point of its surface. The vital powers are, as Bastian says, "uniformly possessed by all parts of the organism," "composed almost wholly of undifferentiated protoplasm." And from this "undifferentiated protoplasm," or "jelly-like material," the vital energy builds up the muscular and other organs. The formation of muscular and nervous tissue by *vital processes* acting on the jelly-like substance, is the conclusion adopted by Bastian; and what other conclusion could be adopted, in view of the facts of embryology, than that life constructs its organs in the first place, as it modifies them continually so long as it holds them. But Bastian, as a materialist, is compelled to express himself vaguely; instead of a *vital force* modifying and carrying on development, he regards the *processes* as the cause of the development — thus assuming that all the powers of life are inherent in the jelly-like substance. But if this were so (nature operating by unvarying laws) we might expect that all such jelly-like substances would show the same inherent powers of life, and if they did it would give great plausibility to the position of the materialist. In meeting the issue Bastian unconsciously resorts to a subterfuge. To say that "vital processes" are the *cause* of anything is as lucid as to say that locomotion is the *cause* of our travelling. *Vital processes* are not a substance or a power, but merely a name for the action of vitality. If we deny the vitality, then the processes are merely chemical and mechanical, and the use of the word vital is inappropriate.

Organization is not the cause but the effect of vitality. The most

learned anatomists can discover no organization that explains the movements of amœbæ, and they seek in vain for any perceptible difference in peripheral nerve filaments between those which have sensitive and those which have motive power. Vitality or vital power is continually going beyond organization, seizing and appropriating dead matter, and endowing it with vital properties by the union with an existing organism which is called assimilation ; and when sufficiently developed and free from material incumbrance, it is competent to take hold of dead matter, producing wonderful changes and transmutations, or moving large bodies weighing more than the human form with great force. These facts, older than any facts of modern scientific discovery, and in recent years as extensively demonstrated before intelligent and critical observers, are unknown only to those who do not desire or seek to know them. If eminent scientists close their eyes and turn away their heads when their dogmas are demolished, they may nevertheless live long enough to blush for their wilful ignorance. I do not choose to follow their shameful example in ignoring the most wonderful ientific facts established in the nineteenth century, in which an invisible, immaterial, intelligent energy has lifted tables, pianos, and other heavy bodies, has produced chemical changes in liquids, constructed cloths of delicate texture, and produced beautiful drawings, paintings and flowers.

There is no evasion of the issue. Either chemical and mechanical forces do all that is done, or a higher and subtler power, called vitality or spirit power, does what is essential. If that higher power exists, it is, like other primitive forces, *indestructible*, and must be capable of existing in other forms and places when it leaves any embodiment. Like caloric, it passes from one place to another without loss ; but, unlike caloric, it has an organized coherence which prevents its dissipation or reduction. The honest and enlightened scientist who is not cramped by bigotry or dogmatism is bound to seek the existence of this force after it departs from the human body, if it can be anywhere detected ; and when millions, uncramped by prejudice, have followed and recognized it in spiritual forms, in more perfect exhibition than it makes in the human body ; when, moreover, the research has been most severely critical and exact, conducted often by those whose names are eminent in science,— to refuse to investigate or even look at the results of investigation is the same exhibition of fatuous bigotry which was arrayed against Galileo.

The fashionable Physiology, in its attempted explanation of muscular motion independent of life, is compelled to rely upon a mere hypothesis. It pretends to account for muscular power as a result of

the combustion of elements of the muscle or of the blood, which furnish carbon and hydrogen.*

But combustion does not generate contractile power; on the contrary it generates caloric, which is an expansive power, and which, so far from favoring muscularity, is a relaxing, debilitating influence; and the greatly increased combustion of fever is accompanied by the almost entire destruction of muscular strength. To assume that an expansive force like caloric is under such circumstances converted into a contractile force, when there is no example in the human body or in any department of nature of such a transformation, is a most unscientific and unwarrantable exercise of a credulous imagination. It is difficult for me to comprehend how men of scientific ability could have yielded to so evident an absurdity, unless we suppose that they were dominated by an invincible materialism and willing to overlook any fallacy to sustain that hypothesis; yet even Liebig assumed that muscular tissue became disintegrated and oxidated and thereby evolved *caloric, which contracted the muscle* and did the work!!! Could human folly go any farther? Traube, following the same baseless theory, maintained that muscular action was due to the combustion, not of muscle, but of fats and carbohydrates. Seriously, however, if such a notion deserves a serious argument, how does the nervous system gather and hold this caloric, to discharge it on the muscle when we wish to act. We know the caloric is immediately diffused according to the laws of conduction. Caloric in the steam engine manifests force, but it is expansive force alone, it never shows contractile power. Combustion occurring in a muscle is the same chemical fact as when it occurs elsewhere, and must produce the same effect — but the more rapid the combustion, the greater the heat, the more the muscle is relaxed. The muscle is much more contractile when cold, and its maximum persistence of contraction is in the coldness of death — the *rigor mortis*. Contractility belongs to cold and magnetism, but the attractive power of the magnet is destroyed by heat. Contractility is a property of muscular substance given to it by the forces of vitality in its organization, and controlled by vitality in its operation, but it is still an unsolved mystery in physiology. Certainly it is not the effect of combustion, nor is it any less conspicuous in the cold muscles of the fish, in which there is so

* "According to Hermann, who has specially studied the chemistry of the development of heat during muscular contraction, muscular work is the result of the decomposition of nitrogenous substances." — *Dr. Beard.* This is an inversion of the truth. The decomposition of nitrogenous substances is a consequence of muscular action, which hinders and ultimately arrests all muscular action instead of causing it.

little of oxidation.* How entirely fanciful this oxygen and caloric theory appears when we attempt to apply it to the movements of amœbæ!

It is very remarkable that this *obvious sciolism* should have been so unanimously adopted with unquestioning faith by modern biologists, when it is but a metaphysical inference from their *a priori* dogma of matter and force, as the cause of all things, though a moment's candid reflection might have suggested that when one form of force is converted into another, it entirely disappears by the transformation, and exists only in the new form. The work that is done in a steam engine is commensurate with the consumption and disappearance of caloric, but there is no evidence that caloric is ever in the slightest degree consumed or diminished by muscular contraction; on the contrary, there is commonly an elevation of temperature about two degrees by vigorous muscular contraction. All the caloric generated in the human body by the consumption of oxygen — all the oxygen is capable of producing — exists in the body as caloric, until it is lost by radiation, conduction, and evaporation. The ingenuity of chemists has been severely taxed to discover the chemical processes in the human body which are adequate to account for the amount of caloric that we know is generated and discharged; and it is not entirely certain that they have discovered a complete explanation. Hence there is no possible opportunity for discovering chemical or combustion processes to manufacture something convertible into contractile force, when all that can be discovered is known to be devoted to the production of sensible caloric, which is discharged without doing any work in the body, precisely as it is from the fire that warms our apartments, having performed its sole office of maintaining the warmth which is a necessary condition for the control of matter by spirit and for all physiological processes. I would not think it worth while to discuss seriously this physiological sciolism but for the fact that it has been flourishing for near thirty years and still contaminates our whole physiological literature.

As, according to the fashionable physiology, vitality is a result of chemical processes in the body, to which the convoluted brain contributes nothing, and from which it expends a great deal, we have been warned against the effects of cerebral excitement, of mental cultivation and of precocity, as though the action of the brain were both exhausting and dangerous.

All of these theories were erroneous, and based upon inaccurate or incomplete knowledge. Education and mental excitement are injur-

* Salmon and other fishes display wonderful muscular power in leaping out of the water ten or fifteen feet, ascending waterfalls.

ious only when they exercise, excite, or fatigue the anterior, intellectual and sensitive portions of the brain, instead of giving normal exercise to the whole brain, which is in the highest degree invigorating, and far more beneficial than muscular exercise.

Among medical authors, ignorance of the brain has been too profound to discriminate between or understand its functions, and to know that the frontal region alone is exhaustive to the vital forces, while the occipital half is the very seat and source of vital power.

Not understanding this, the world has adopted an educational system which attempts to exercise the frontal brain alone, which exhausts the physical and moral energies, undermines the health, injures the eyes and shortens life. Then, attributing these evils to education and cerebral activity, it regards the latter as unfriendly to health, and unsuitable for woman, when, in reality, a normal or complete education is an evolution of health and vigor, and the cerebral activity which embraces the emotions and energies is a grand renovator of health and invigorator of the constitution.

Influenced at first by the old theories universally taught in the colleges, it was difficult for me to understand the true relations of the brain to vitality, until by many experiments and prolonged study it became apparent that vitality was not the product of organization, but organization was the product of vitality, which is the organizing and sustaining power, the dominant power in our complex constitution. This vitality has ever eluded and baffled the medical profession, because they have regarded biology as one of *the physical sciences*, and thus, reversing the plan of nature, have regarded combinations of matter as the source of life (although they have been unable to produce life by any chemical combination), and hence have fixed their attention on matter alone, ignoring life — treating it as a phenomenon or a fact — of no substantial existence or power, and entirely refusing to follow or witness the evidence of its continued existence after its separation from matter, because such evidence annihilates dogmatic theories.

That this gross materialism has usurped the control of biological science is sufficiently evident when we find that a President of the American Association for the Advancement of Science could give a public lecture in New York, denying vitality as a power, and assuming its origin from mechanical and chemical causes, without a word of protest from scientists, clergy, and literati. Such scientists expect by thermometric observation to find the calorific and mechanical equivalents of thought and emotion, as Joule determined the mechanical equivalent of caloric! They are altogether too serious and positive to see anything ludicrous in such speculations, which have been

sanctioned by Huxley, who says he believes "we shall arrive at the mechanical equivalent of consciousness, *just as* we have arrived at the mechanical equivalent of heat." Of course then we shall know just how many grains, ounces, or pounds a poem or a philosophical theory weighs. Positive dogmatism never knows when its extravagance has become ludicrous, and Prof. Huxley afforded a good illustration when he revamped the theory of Des Cartes that animals were machines as much as clocks, moved by certain physical forces without consciousness. But as there are many animals with which he could not compete in the knowledge and memory of localities personally observed, or in strength of parental affection, or in the skill and courage of a combat for life, his logic would be just as good to prove himself an unconscious machine; and in fact a dogmatic philosophizer who cannot or will not reason fairly has a much closer resemblance to a machine than he would suspect.

Prof. Huxley is a brilliant illustration of the power of self-confident, undiscriminating, and reckless assertion in imposing upon a public, well prepared by its ignorance of the subject to accept him as an oracle. He asserts "protoplasm" to be the basis of life; but, with a slipshod looseness unworthy of a scientist, he applies that term, not to the true *bioplasm*, the living matter which displays a formative power and all the endowments of life, but indiscriminately to dead and living matter, to muscular and nervous structures, solid substances; while the true *bioplasm* is never either a solid or a structure of completed organization. His loose expression covers all albuminoid materials, and in fact amounts to nothing more than a jumble of all substances which are substantially composed of something near the old formula, Carbon 51.8, Oxygen 21.3, Nitrogen 15, Ash 4.25. Instead of calling this "the physical basis of life," he should have called it the chemical basis of the animal body. In his loose phraseology, roast mutton is protoplasm.

Such language reads more like the rattling talk of a physiological demagogue (*ad captandum*) than the accurate expression of a scientific mind. To this mongrel protoplasm, dead or living alike, he ascribes the vital capacities which are never found except in the living unorganized bioplasm, deriving its properties from a prior bioplasm as far back as we can trace its ancestry. But Prof. Huxley would have his blind followers believe that whenever the carbon, oxygen, nitrogen, and hydrogen, etc., are well combined in due proportion life will be produced. Nature demands a prior life, but he ignores that fact. But the absurdities of Huxley's assertions are too numerous to be criticised further. The Huxley doctrine of the "Physical Basis of Life" has been refuted by J. H. Stirling, LL.D.,

in his work, "As regards Protoplasm, in relation to Prof. Huxley's Essay on the Physical Basis of Life," and this refutation has been pronounced "complete and final" by Sir John Herschel.

We are compelled to choose between this gross scientific materialism — which annihilates Pneumatology and Religion — and the true science of life, which recognizes its potentiality in the living body, and, accepting the irrefutable and superabundant evidence of its continued existence after separation, enters with pleasure upon the profound and sublime study of PNEUMATOLOGY, in which science enters the sphere of wisdom and love.

If life is a reality, a power, a cause, and not a mere phenomenon or effect, the question arises where it is located, whence it comes, and how it is fed or sustained. These questions must be answered before we can determine the relation of vitality to the brain.

If life is a distinct element of permanent existence — as permanent and as distinct as the oxygen which constitutes the major part of the human body, — it must be, like other elements, derived from some abundant supply of the same element, and if it increases, it must increase by influx from its source, as do the ponderable elements which are supplied by influx of food.

The ponderable elements do not supply life, but only an apparatus for its use. When their supply ceases, the physical apparatus of life is lacking, and we die of inanition — *i. e.*, life leaves a structure which is incompetent to hold it, or, rather, to which it cannot hold.

As bodily structure comes from material influx, it is equally true that *all life is from influx*. There is no such thing as life inherent in structure, ALL LIFE BEING INFLUX, and this becomes evident by a brief and simple course of reasoning.

The life of any limb, or other part of the body, depends immediately upon the influx of blood, and its death follows the entire loss or removal of the blood. When the blood is excluded from a muscle it is benumbed, and if the exclusion continues it produces gangrene (total death). The increased development of vitality which comes from an increased supply of blood is seen when the circulation of the face is increased by section of the cervical ganglionic nerves. In these cases the evolution of heat is greater, the sensibility longer resists the influence of chloroform, the rigor mortis is later in its appearance, and putrefaction does not begin so soon. But the blood has no more inherent vitality than the limb. If it stagnated in the limb, the limb and the blood would die together. It obtains the conditions of vitality in the lungs, and dies when deprived of those conditions. But it is not the structure of the lungs that imparts the conditions; it is the air that enters the lungs, without which influx

lungs, blood, and organs all die. Thus there appears to be an influx through the head, by the trachea, of a vitalizing element, which we call oxygen, which is a magazine of the conditions necessary to vitality, but not of vitality itself. Food supplies the physical elements, and the continued influx of both is essential to life, but does not make life. The limb that is supplied by alimentation and respiration with good blood is not thereby kept alive, but only in a viable condition.

The material element capable of forming the structures that manifest life is a substance similar to albumen, in which carbon is a little more than half. The solid elements of flesh and blood are compounds of which the average composition is very near this formula: Carbon 51.9, Oxygen 21.3, Nitrogen 15, Hydrogen 7.6, Mineral elements 4.3. In fibrin there is three per cent. more of carbon and a trifle less of hydrogen. In the nervous system this albuminous or protein element is associated with a quantity of phosphorized fat of variable amount, sometimes an equal quantity or even a trifle more, sometimes only half as much. In the albumen of the blood, which corresponds nearly with muscular substance, Mulder found 400 atoms of carbon, 310 of hydrogen, 120 of oxygen, 50 of nitrogen, 2 of sulphur, and 1 of phosphorus. In the nervous matter of the brain and nerves the chemical character is materially different, as the fatty matter, which is often one half of its substance (excluding water), contains almost exactly the same number of atoms of hydrogen as of carbon. The brain, therefore, is distinguished from the rest of the body by its greater amount of hydrogen, in which it differs from the protein basis of bodily structures, or what Huxley has called *protoplasm*, "the physical basis of life." Thus, as we see, vitality has *its home* in a structure which differs so much from the so-called protoplasm that it is apparent that Prof. Huxley has generalized in a very hasty and unscientific as well as dogmatic manner. He would not have been much farther from the truth if he had maintained that fat was an essential "physical basis of life," for it is as necessary as protein or protoplasm (which are synonymous with Huxley). Materialists cannot discuss the mysteries of biology without running into absurdities; such, for example, as Dr. Hammond's theory that we need not die if we could keep up an exact balance between the waste of the body and its supply by food. In addition to this combination of albuminoid and oleaginous matter, as the receptive substance, life requires the presence or environment of oxygen. This is essential to all vital processes. Seeds which are entirely deprived of air will not germinate, and an excessive supply of oxygen accelerates the germination. In animals the demand for oxygen is proportional to the activity of life.

That the kingdom of vitality or vital force is as widely distinct from that of mere physical force as electricity is distinct from gravity or hydrogen distinct from gold, is shown by the fact that it is impossible to construct bioplasm by any physical or chemical forces, no matter how well the materials are brought together. Sir H. Roscoe says very truly: "Protoplasm, with which the simplest manifestations of life are associated, is not a compound but a structure built up of compounds. The chemist may successfully synthetize any of its component molecules, but he has no more reason to look forward to the synthetic production of the structure than to imagine that the synthesis of gallic acid leads to the production of gall-nuts."

But an influx from the nervous system is necessary to give the vital capacity for sensation and motion; and influx through the nervous system is necessary to give motion to the heart and the proper conditons to the blood-vessels for circulating the blood. Hence without the nervous system there can be neither conscious active life in man, nor the circulation of blood and respiration of air which give the conditions of vitality, nor the consumption of food which supplies material.

In recognizing the nervous centres as the seat of life we are simply recognizing the universal law of the animal kingdom, in which we see that the rank and character of every animal is determined by its nervous system, of which the brain is the principal portion. Even when we descend to the smallest micro-organisms, with a nucleus, that can be investigated, we find that their life and psychic endowments belong to a small central structure, the nucleus, from which the power, action, growth, and reproduction are imparted to the protoplasm that constitutes their bulk.

The experiments on micro-organisms, ciliated infusoria, such as the Stentor and Cyrtostomum, by Gruber and Balbiani have demonstrated that the life of these minute animals (the cyrtostomum measures three thousandths of an inch) depends upon their central nuclei, and that, if they are divided into two or more parts, any part which contains a nucleus will grow until it reproduces a complete animal, but that parts which have no nucleus, being merely protoplasm, cannot grow into a complete animal but die in from four to eight days, although they move about with freedom while they live, as a decapitated chicken will flutter for a time without its brain, and cold-blooded animals have their lives prolonged after the loss of the brain.

As life is manifested by sensation, motion, circulation (and consequent nourishment), and as all three are dependent on influx from the nervous system, it is obvious that life really comes into all parts from its seat in the nervous system. And although the digestive organs

supply material and the lungs supply by means of oxygen the imponderables, their actions depend on the nervous system, and are but subordinate contributions incapable of evolving life, which comes entirely by the nervous system, and takes its departure therefrom when it leaves the body, first abandoning its outposts in the lower limbs, concentrating to the upper end of the spinal cord, lingering in the chest, then in the base of the brain, and finally leaving from the upper portions of the brain, in accordance with pathognomic laws, and as has been observed by clairvoyants. After death, the muscles of the limbs, as shown by Onimus, lose their contractility much sooner than the muscles of the trunk, and the extensors before the flexors. A similar order of succession is observed in general palsies. In the application of electricity we find the excitability of the nerves greater as we approach their origin at the spinal cord.

That death occurs from below upwards was illustrated by the celebrated physiologist Claude Bernard, in experiments on the nerves and muscles of frogs. When the animal dies from loss of blood or from woorara poisoning, the filaments of nerves nearest the muscle first lose their vitality, the nerves die from the periphery to the centre, and the muscles that have ceased to obey their nerves may be roused by induction currents applied nearer the spine or upon the spinal cord at the roots of the nerves. The death of the nerves, as shown by Von Bezold, begins in the filaments which are distributed in the muscles, which gradually lose their power, and progresses through the trunk of the nerve to the spinal cord. The convulsions produced in rabbits by excluding the blood from the brain are most marked and prolonged in the hind legs, and they also soonest pass into cadaveric rigidity.

If then life emanates from the nervous system which actuates the muscles, the lungs, the digestive organs, and the circulation, and which also controls nutrition — it is evidently a vital neurological influx, which through the nervous system controls the *material influx* of food, water, and oxygen and their assimilation, and the seat or channel of this influx must be sought in the controlling portions of the nervous system, which we know are in the cranium.

In discovering this truth we are led to important practical conclusions for hygiene and for virtue. We learn that it is far more important to cultivate and energize the brain and the soul than to confine our attention to purely physical matters. We learn that with proper spiritual energy man's life may be efficient and successful, but without that higher energy, an abundant nourishment may develop only a gross and degraded humanity.

The knowledge of the vital power of the brain enables us to pro-

ceed with great confidence when by the nervauric methods we treat the entire constitution through the brain. We know that a current of dark blood through the brain will suddenly deaden all the powers of life, or a current of watery blood will enfeeble them. A sudden pressure on the brain makes a blank in our conscious existence, and even a current of water on the head may subdue the vital energies. Prof. Stokes, recommending Dr. Abercrombie's method of shaving the scalp and pouring upon the head, held over a basin, the contents of a jug of cold water from a height above, says: "So great and instantaneous is the *depression of the vital power* produced by this mode, that it must be used with caution. There are numerous cases of persons in the highest state of maniacal excitement, reduced in a few moments to a low and weak state by this powerful remedy. There are also instances of its *rapidly depressing* effect in the early stages of acute hydrocephalus."

The depressing power was of course chiefly produced upon the upper surface of the brain, which was most exposed to the action of the cold water, and which is so important as a source of vitality. Life retreats from below upwards toward its citadel — from the limbs toward the spinal cord, from the cord to the brain, and from the base of the brain to its summit, where severe injuries are fatal. Valentin says: "If one removes the two hemispheres of a mammal by slices the mental activity sinks the lower, the further the loss of substance proceeds. When the ventricles of the brain are reached, complete unconsciousness is wont to appear."

In asserting life to be an influx we do not assert that the influx is *exclusively* into the brain. The brain being the supreme seat of life and associated with influx leads to the inference that nervous life elsewhere may in like manner be associated with influx. There is a vigorous life in fishes, in which the cerebrum is very small and the entire brain very small in proportion to the spinal system.

The ganglia of insects, which correspond to our cerebro-spinal system, are the seat of a very active influx, producing greater psychic manifestations in proportion to their size than we have in the human brain. In cold-blooded animals (reptiles and fishes) the heart continues to beat many hours after decapitation, and even after it has been taken out of the body, if its ganglia are not destroyed. Even in warm-blooded animals (as the rabbit) the heart continues many minutes after death produced by stopping the cerebral circulation.

Hence there is probably an influx of life, capable of sustaining muscular and visceral action, distinct from that which comes into the brain. I say *probably*, for when we consider the complete analogy between the brain and body, the assertion of an influx to the brain

renders the influx to the nervous system of the body probable, as it maintains for a time its vitality after decapitation and for a considerable time in the acephalous fœtus, as well as cases in which, by concussion, hemorrhage, or ramollissement, the influence of the brain is more or less excluded. The body, according to analogy, must have a region of influx as well as the brain, and this region must be interiorly on or near the median line, which would be along the bronchi, the pulmonic and cardiac plexuses, and the solar and semilunar ganglia.

This is further confirmed by the fact that in somniloquent conditions intelligence and the external senses have been transferred to the epigastric region. Although the primary function of this corporeal region may relate to atmospheric and chylopoietic absorption, the transferability of the spiritual faculties to the body would indicate spiritual capacities in the trunk, and probably capacities for spiritual influx, for the bodily region acts in concert with the cerebral, and it is not extravagant to assume that the soul does in a certain sense occupy the entire body, which may be regarded as an essential appendage of the soul. The influx of thought and emotion to the brain is greater when the life and action of the central region of the body is greater, and while the energetic action of the limbs and muscular system generally exhausts the brain, that of the heart and chest (and I may add stomach) greatly increases its power. What is the nature of this influx is as yet unknown. It probably comes in with the air, without which it cannot occur, and we may suppose the lungs to maintain the same relation to the atmosphere as the brain to an ethereal or spiritual atmosphere. This view is illustrated by the recent experiments of Dr. B. W. Richardson, showing that air which has been respired loses its life-supporting quality, independent of any change by loss of oxygen or acquisition of carbonic acid. Indeed, we know that the life supporting quality of the atmosphere is continually varied as it comes from dry and sunny regions or from dark and damp localities, there being some element or condition in it which chemists have not detected.

This influx to the thoracic ganglia and that to the solar plexus correspond with what we believe occurs in the brain. The pineal gland is the organ of the chief cerebral influx, and our Sarcognomy recognizes the solar plexus as the correspondent of the pineal gland, enjoying the same influx on a lower plane.

The cardiac plexuses and ganglia, which alone can sustain the heart when it is removed from the body, and in cold-blooded animals for many hours, have in man a connection with and partial dependence upon the three ganglia in the neck; of these the superior cer-

vical controls the anterior circulation and consequent development of the brain, while the vertebral controls its posterior circulation and development.

Thus it appears that the cardiac nervous system which sustains the circulation that animates the entire person, is intimately associated with the brain as a centre of life, supplying blood to the brain in return for vital influence, each being essential to the other.

If we should follow the theory suggested by analogy, of the priority of the inferior structures, we might suppose the ganglionic system to be the primitive seat of life in the human body, and the brain its latest evolution, but such a theory is not verified by the microscope, as the cerebro-spinal nervous system is the first distinct nervous organization seen when the ganglionic system is entirely imperceptible. The first thing distinctly seen is the primitive streak of nervous matter formed in the serous membrane (which soon overlaps it and forms the spinal column), one end of which is manifestly enlarged as the beginning of the brain. The brain is therefore an original structure, and not an outgrowth from an inferior apparatus, though very incomplete in its germinal condition. In human ova three or four weeks old we find the embryo (according to Todd and Bowman) not more than two lines in length. At this very early stage they say "the anterior cerebral vesicles are well marked, and immediately behind them are the very large corpora quadrigemina." The heart is not yet fully formed, and projects from the anterior surface of the body as a bent tube, "consisting of a simple auricle and ventricle." "Behind the heart is seen the liver."

Thus does the brain originate by the laws of germinal growth, before a complete vascular system has appeared, hence it does not appear to be built up in the first instance by the ganglionic system and their subordinate vessels, but appears to be organized at the beginning of the human structure.

This statement of Todd and Bowman, however, appears to be incorrect as to the time of development, for the very careful observations of Tiedemann and his predecessors did not find so advanced a development in the first month of the human embryo, in which he found only a translucent and fluid condition, without a trace of organization; the same being true of animals in a corresponding though earlier stage. The writings of Harvey and Haller contain the same statement.

In the fifth and sixth weeks from conception, when the embryo is four or five lines long, it is still nearly transparent and the germ of the brain is still fluid, though disposed to subdivide into different structures, the development of which he regards as controlled by the

serous membrane, the pia mater, in which blood-vessels first appear. In this stage the head is relatively large, presenting a slight appearance of mouth and eyes, while the limbs are indicated only by slight projections; a condition which illustrates the priority of the brain. In the fluid states at the origin of life vitality has a perfect organizing power without machinery. In the seventh and eighth week, the embryo being seven or eight lines long, with some indication of nose and ears, the transparency is greatly diminished. Bones and muscles are not yet apparent, and the brain has the consistence of the white of an egg and may be examined after hardening with alcohol. It then exhibits the essential elements of a brain — the rudiments of the cerebellum curving out from the medulla oblongata on each side, but not yet united on the median line, above which are the quadrigemina, thalami, striata, and germinal beginning of the hemispheres of the cerebrum. The quadrigemina, like the cerebellum in this stage, are but leaflets turning in to the median line but not yet united, and measuring one line. The thalami measure two thirds of a line, and the striata one line, on the margin of which is a small leaflet or membraniform structure destined to form the hemispheres.

It is thus clear that the cerebro-spinal nervous system has a priority of organization starting from a single cell, advancing into a homogeneous fluid condition, becoming gelatinous and ultimately fibrous and cellular, the muscular and osseous system following at a long interval. At what stage the ganglionic system becomes organized and active the microscope has not revealed, as it is too minute for observation.

In the full development of man, the brain becomes the central control and channel of influx. To what extent the ganglia of the abdomen and thorax participate in this influx is a question for future investigation. The pre-eminence of the brain in vitality cannot be doubted, as gifted individuals, in exalted religious and spiritual conditions of the brain, become so highly charged with vitality as to expel formidable diseases by laying on hands or even by coming near the patient, and directing their mental energy to him, thus showing that they have in their brain and spiritual life an excess of power which may be transferred to another. But when the brain is suddenly paralyzed by concussion, crushing, or lightning stroke, there is an instantaneous and complete death through the body, — the heart as well as the muscles suddenly ceasing, and the blood being so thoroughly killed as not to coagulate.

The influence of a regimen which stimulates the brain was shown by the report of M. Gasparin to the French Academy upon the diet of the working population. He ascertained the usual amount of

nitrogenous food in the diet of the laboring population of France, and ascertained that Belgian miners performed the most vigorous labor, beyond the average of French miners, with much less food — less even than the inmates of workhouses and the monks of La Trappe. "The mining population of the environs of Charleroi" (says M. Gasparin) "have resolved this problem to nourish themselves completely, preserve health and great vigor of muscular strength, upon a diet with less than half of the nutritive principles of that indicated by observation in Europe."

The distinctive peculiarity of the diet of the Belgian miners is the use of a potent cerebral stimulant. They use three times a day half a pint or more of coffee, using no other beverage, — coffee, bread and butter being the major part of their diet. This gives a stimulus to vitality which resists the rapid disintegration of the tissues, and by diminishing the amount of excretion diminishes the necessity for food in proportion. In the same way the demand for food diminishes in those who live under high heroic excitement, like Kossuth, who in the Hungarian war was accustomed to take but one meal a day. "We know," says M. Gasparin, "how sober people are who drink coffee. The prodigious abstinence of the caravans, the slightly nutritive regimen of the Arabs, come with all the authority of experience in support of the effects attributed to this beverage; and the distribution of coffee to the French troops during their fatiguing marches through Algeria is regarded by the officers as one of the best means of enabling the troops to support them." Physicians are well aware of the sustaining effects of Erythroxylon coca, so long used by South American Indians for protection against fatigue and hunger, being a powerful cerebral stimulant.

There is much truth in the conclusions of M. Gasparin, but he overlooks the fact that human constitutions are not all alike, and that some are naturally able to live on a smaller quantity of food than others from having greater tenacity of constitution and greater power of appropriation of nourishment.

Food must give us something else in addition to the chemical constituents of the body — something that sustains our spiritual energy, without which health declines. The fibrin of the blood is, chemically speaking, a complete embodiment of nutriment, but dogs fed upon it will starve in about a month, according to Majendie, for it is lacking in something not yet understood. Human beings need spiritual food — something addressed to the emotions — sympathy, respect, love, gayety, hope, emulation, and something to encourage ambition. The hopelessness and dreariness of the situation paralyze every energy, accelerate disease, and shorten life. Hahnemann well said in his

"Organon:" "Spiritual sufferings greatly undermine the state of health, and even the most skilful physician will find it impossible to procure the patient relief under those unfavorable circumstances. Grief and sorrow are the principal causes which either develop latent psora or aggravate an already existing secondary psoric affection. Excessive fatigue, working in marshy regions, great injuries and wounds, excessive heat and cold, starvation, poverty, not wholesome food, unhappy marriage, and a gnawing conscience, etc., which are causes that exhaust the brain, bring on disease."

It is easy to verify the transmission of life from the brain to each and every organ of the body by interrupting the channels of its transmission, and finding that life is impaired or destroyed in proportion to the interruption, as a stream is diminished when its fountain is obstructed, and disappears when it is closed.

The spinal cord through which the brain power is transmitted is so strongly protected by the bones of the spinal column that it is only in severe injuries that we discover its importance. In the nervauric experiments which I have introduced, we are exempted from the necessity of studying the records of surgery or engaging in the tedious cruelties of vivisection, as the human hand can evolve any local function regardless of the hindrance offered by bones and integuments.

Injuries of the spinal cord operate with terrible effect upon all parts which lose their connection with the brain by the injury, or have their connection impaired.

Brodie says that "wounds which penetrate through the external parts into the spinal cord are almost invariably fatal at a very early period, the examples of recovery from them being very few in number." "The effect of a violent concussion is at once to impair, and even to destroy, the functions of the spinal cord, sometimes even causing the patient's death in the course of a few hours."

It is well known that when the cord is divided or severely injured by compression, all sensation and voluntary motion are lost below the point of injury. The inferior parts are beyond our consciousness and beyond our control, as if they belonged to another individual. Surely such facts should have fixed in the minds of biologists the truth that life belongs to the brain and to other parts in proportion as it is borrowed from the cerebro-spinal system, of which the brain is the commanding centre.

Injuries of the spinal cord seldom amount to an absolute isolation of the parts below the injury, as the physical connection exists notwithstanding the laceration or compression. But if the injury be sufficiently severe and sufficiently high on the cord, then death is speedy. The quickest way to kill an animal (except crushing the

brain) is to sever the cord just below the cranium. "A case of sudden death from dislocation of the second vertebra is recorded by Petit, and other similar cases are described by Sir Charles Bell and Mr. Stafford. The latter author mentions two cases of death taking place immediately from fracture of the second and third cervical vertebræ. "I attended a young gentleman who labored under symptoms of caries of the superior cervical vertebra, and who, having eaten a hearty dinner, suddenly expired while altering his position in bed." (Brodie.) Evidently, as all life in the body proceeds from the brain, the severance of the spinal cord immediately below the cranium, or its severe compression, must be immediately fatal, and all surgical records confirm this statement.

A remarkable illustration of this is mentioned by Sir Charles Bell in his "Anatomy:" "A young man was brought into the Middlesex Hospital, who had fallen upon his head. He soon recovered, and lay prostrate for some time without exhibiting a symptom to raise alarm. He had given thanks to the assembled governors of the hospital, and had returned into the ward for his bundle, when, on turning around to bid adieu to the other patients, he *fell and in the instant expired.* Upon examining his head, it was found that the *margins of the occipital hole had been broken:* no doubt it had happened that in turning his head the pieces were displaced, and closed and crushed the medulla oblongata as it passes from the skull."

But as spinal injuries commonly amount only to a slight laceration or a slight compression, life though greatly impaired may in some cases continue until the injury has been repaired.

In these cases, however, organic life is gradually impaired to a great extent — an extent proportional to the injury. Thus the bladder becomes paralyzed and incapable of expelling its contents. The secretion of urine is either entirely suspended or becomes quite morbid, having a disgusting odor, an unnatural color, and amorphous sediment. It is most commonly ammoniacal (corresponding to its decay when outside of the body), turbid, and full of unnatural mucus derived from the bladder and frequently containing blood. In other cases the quality of the urine changes from day to day. The bladder, by impairment of its vitality, is in a congested condition, with adhesive mucus and phosphate of lime in its interior.

The bowels become torpid and require the most powerful purgatives to move them; the abdomen becomes tympanitic. Evacuations sometimes take place unconsciously and involuntarily. Vomiting occurs in other cases, ejecting large quantities of dark-colored fluid. The alvine evacuations are sometimes of a black tarry character and highly offensive odor.

The external parts show an equal loss of vitality, and sloughs are formed, and gangrene developed from the mere pressure of lying on the bed. Sloughs often appear on the sacrum, nates and ankles as early as the second day. The sloughing is more severe when the injury is higher up, and consequently vitality more completely excluded, and all the surgeon can do is to endeavor to diffuse and moderate the pressure.

Notwithstanding the severe consequences to the body, the brain is not usually affected unless the injury be above the cephalic and pulmonic regions of the cord, with which the brain maintains a close sympathy. "I have seldom observed," says Brodie, "the sensorium to be materially affected, except where the injury was in the cervical portion of the spinal cord."

The heart is not directly dependent on the spinal cord, but indirectly through the ganglionic system, and consequently is not liable to the same sudden paralysis as the voluntary muscles; nevertheless "the first effect which a severe injury of the spinal cord produces on the circulation is to lessen the force of the heart's action and to cause a state of general depression and collapse, the pulse being very feeble, contracted, and sometimes scarcely perceptible. When the injury is in the lower part of the neck, the patient not infrequently dies before complete reaction is established, the pulse remaining feeble to the last. In the majority of cases, after the first twenty-four hours the pulse rises to 96 or 100 a minute; but still it is feeble and contracted, indicating a state of great general debility. The appearance of the tongue corresponds to the character of the pulse; it is not unusual at the end of twenty-four hours to find it dry and parched, covered with a brown fur, which is soon converted into a black crust, resembling what we observe in the last stage of a continued fever."

The blood also has the characteristics of fever, the coagulum being large and loose, or soft as when its vitality is reduced by miasmatic poison.

The analogy of the conditions produced by obstructing the action of the brain on the body to those produced by the devitalizing power of malaria and the consequent fever is quite striking; and it is a curious coincidence that in a case described by Sir Charles Bell, in which there was a fracture of the eleventh dorsal vertebra, death took place on the fifth day, preceded by *typhoid symptoms* — symptoms which indicate inflammation of the ileum, which is controlled by the lower dorsal portion of the cord — the portion injured in this case.

Injuries and morbid conditions of the brain produce a great variety of morbid conditions in the body; and Dr. Brigham remarks that "after death from injury of the brain, putrefaction of other

parts of the body takes place much more rapidly than after death from the injury of other organs." Decomposition is very rapid after death by sunstroke, by lightning, or by suddenly fatal poisons, as these causes attack the brain and nervous system.

The direct injury of the brain by miasmatic poison, which is the cause of typhus fever, develops a group of symptoms singularly analogous to those which follow the impairment of its influence by injury of the spinal cord. After the death of 150 from sunstroke, at Chicago, in July, 1887, the authorities were urgently called on for immediate examination, as the bodies were decaying. "After no disease" (said the coroner) "does a body decompose so quickly as after sunstroke."

"Most of the fatal cases of typhus" (said Prof. Graves) "at present die of cerebral disease." "In the genuine typhus fever" (says Dr. Gerhard) "this is almost always the case: very few patients die of this disease without strongly marked cerebral symptoms." And yet there is seldom any appearance of inflammation of the brain in such cases. The functional impairment of the brain alone is enough to destroy life, and even the act of rising from the bed and standing erect, so as to draw the blood by gravitation from the brain, is sufficient in cases of exhaustion, especially cholera and typhoid fever, to produce the death of patients, who but for that imprudence might have been saved.

Traumatic injuries of the brain are liable to result in general impairment of health or tuberculization, even when there is no immediate appearance of serious damage. Dr. R. H. Reed, of Mansfield, Ohio (in a paper before the National Association of Railroad Surgeons, at St. Louis, May 2, 1889), detailed six cases of wounds of the head, from which he drew the conclusion "that grave injuries of the brain are liable to be followed with such a degree of devitalization of the economy as to favor general tubercular degeneration," and that an embolus may cut off the blood supply of a certain arterial territory, and so devitalize that portion of the brain and result in an abscess and death." The brain degeneration in these cases was generally indicated by the presence of phosphates and indican in the urine.

When we experiment upon the brain directly we are vividly impressed with the control of all life. A fracture of the skull, leaving a broken piece of bone compressing the brain, arrests the conscious life in the midst of its ideas of the moment, which are resumed as the pressure is removed. The paralysis and the numerous forms of disease produced by affections of the brain, the convulsions, fevers, hemiplegia, insanity and diseases of many varieties demonstrate the

brain to be the most important organ. Every change in the circulation of the brain produces corresponding changes in mental activity and vital power.

Bichat made some instructive experiments on dogs to illustrate the effects of blood upon the brain. In his work on "Life and Death," page 247, he says: "I opened the carotid and the jugular vein of another dog, and after tying the extremity of the carotid next the heart, received the blood of the jugular into a warm syringe and injected it into the brain. The creature appeared immediately to be agitated, breathed quickly, and seemed to be in a state of suffocation similar to that of asphyxia. Its animal life became entirely extinct; the heart, however, continued to beat and the circulation to go on for half an hour afterwards, at the end of which time the organic life was terminated also. This dog was of middle size, and about six ounces of blood were injected with a gentle impulse, for fear of that being attributed to shock which ought to have been the result of the nature and composition of the fluid. I repeated this experiment upon three dogs the same day, and afterwards at different times upon others. The result was invariable, not only as to the asphyxia of the animal, but as to the concomitant appearances.

"I have killed animals in this way with ink, oil, wine, and water colored with indigo. The greater number of the excrementitious fluids, such as urine, bile, the mucus of catarrhs, occasion death by their simple presence on the brain. The serosity of the blood is fatal, but not so quickly. I have injected them all into the crural artery. In this way they are none of them mortal, but occasion always a torpor amounting even to paralysis at times."

Majendie found that injecting a considerable quantity of water into the veins of an animal produced a kind of stupidity which indicated a want of action in the brain.

Physiological anatomy alone indicates plainly that the brain must be the most important organ in the body, since it receives, as commonly estimated, six times as much blood in proportion to its size as other portions of the body; hence it must perform far more active and important functions than the other organs.

Without looking farther, we have facts enough to establish clearly that all life depends upon the brain, and that just in proportion as the influx from the brain is hindered by any injury to its well-protected channels, every vital process is deranged or suspended. If the hindrance be absolute and complete, death is immediate, for the death of the body deprives the brain of the conditions and elements necessary to retain vitality.

Injuries of the nerves, also, by cutting off their dependent parts

from the spinal cord, show similar results, in loss of vitality and predisposition to disease. It is stated in the *Medico-Chirurgical Review*, vol. 22d, that Mr. Earle cut the ulnar nerve behind the elbow, and that in consequence the fore-arm became disposed to constant attacks of inflammation, and the temperature of the little finger was four degrees lower than that of the other.

According to Demarquay ("De la Regeneration des Organes et des Tissus") when a nerve has been *cut*, the central end in connection with the nervous system does not degenerate, but the exterior end does, rapidly undergoing a fatty degeneration, completed in six or eight weeks. The muscles begin to degenerate in about three weeks. But with regard to paralyzed nerves and muscles which *retain their connection* with the central system, it is remarkable how well they are preserved for a long time. "It is a common observation" (says Dr. Poore) "that after a hemiplegia has endured for many months, the wasting of the muscles is often trifling in the extreme, and as often as not the electric irritability to both forms of the current remains the same as on the healthy side. If, however, a man injures a peripheral nerve — say his ulnar, or one of the branches of the external popliteal — it is astonishing with what rapidity the muscles supplied by the injured nerve waste, and how soon the electric irritability becomes altered." The muscles cut off from their nerves would not only waste away and lose all irritability, but would also die and rot, if it were not for the vascular connection which brings them living blood, and also the influence of the ganglionic nerves, which are coextensive with these blood-vessels. Claude Bernard claims that the growth and changes of all the organs are affected through the nervous system only by the control of the blood-vessels, but in this case we see the blood vessels and their nerves uninjured and the blood supplied, but atrophy occurs because the vitality from the brain and spinal cord has been cut off, except so far as it may be supplied by the blood and the vasomotor nerves. If the theory of Bernard were true, there could be no atrophy after the section of a muscular nerve. Yet Bernard is one of the most eminent modern physiologists, and in trying to locate vitality in the tissues instead of the central nervous system, he is merely following the mechanical anti-vital drift of the profession, which he has carried to the *reductio ad absurdum*.

There is a great wasting of the muscles even when they are not cut off from the cord and brain by section of their nerves, in cases of hysterical paralysis. In these cases there is a loss of sensibility as well as motion, and consequently the muscles can have no reflex influence from the cord, and it no longer sustains them.

The ganglionic system extending along the spinal column, and sending its ramifications along all blood-vessels, has been regarded as an independent seat of life, but in man, at least, its action soon ceases when the influx from the brain is cut off.

The spinal and ganglionic systems are connected along the whole spinal column; and Bernard has shown the ganglionic (vasomotor) nerves of the upper extremities arise from the roots of the dorsal spinal nerves from the third to the seventh pair, and those for the lower extremities from the lower dorsal and lumbar roots. Hence the upper dorsal region of the spine has an influence upon the arms as well as the cervical region which originates the brachial plexus.

That the ganglionic or sympathetic system which supplies and governs the heart and all the blood-vessels is under cerebral control is shown in the facility with which mental conditions agitate the heart, disturb the stomach, or derange the bowels, even producing fainting, convulsive action of the heart, vomiting, or an attack of cholera, and in impressible hypnotic subjects producing actual disease of the nature of what is impressed on the mind. None of these experiments are more remarkable than the production in St. Francis, in 1224, and a number of Catholic devotees of both sexes since, of the stigmata or imitation of the wounds of Jesus, which sometimes even bleed. The same pervasive power of the brain controls and modifies the life and growth in the womb. In short, there is nothing in man beyond its control.

CHAPTER III.

CRITICAL DISCUSSION AND EXPOSITION OF ERRORS.

Tenacity of the old ideas — Centralization of life in higher developments — Incapacity to realize the functions of the heart and the brain — Disregard of Gall and indifference to experiments — Prof. Mitchell's experiments — Defective reasoning capacity — Origin of life by influx — Sanative power of the brain — Philosophy of life — Huxley's admissions as to the vital power — Opposition to psychic science — Importance of psychic co-operation — If life is but the forces of matter the largest animals must have the most — Superiority of the small — Psychic truth demands our support — Vague ideas of physiologists: Todd and Bowman, Bennett, Flint, Bain — Doctrines of John Hunter, Dr. Prout, Muller, Beclard, Bichat, Carpenter — Life is not transformed heat — Carpenter's absurdities — Beale's statements as to the nerves — Chemical action not the source of life — Life always comes from life, as matter comes from matter.

Ultimate seat of life in the tissues, in fluids and imponderables — Living substances in the air — How to obtain amœbæ — Vital actions of minute bodies — Their psychic life — Character and action of bioplasm — How it forms the body — Passage of vital forces by contact, in and out of the body — Nerve organization beyond the microscope.

How clearly does it appear, when we consider all the facts, that life in the body is an influx from the brain, not only in its voluntary but in its involuntary processes, all of which are controlled by the action of the brain and responsive to its emotional conditions, which not only control every secretion, every movement of fluids and every vital change,* but transmit a similar life with all its psychic and physiological peculiarities to a new being in the womb.

And yet so strong is the domination of habit and of world-wide opinions, that I retained the old biological ideas on this subject longer than I am willing to confess, without comparing them with facts. Like other physiologists, I regarded the brain as an addition

* The most perfect demonstration of this is found in the famous *stigmata* of religious fanatics, in whom the power of imagination has reproduced the appearances of the crucified body of Jesus. This has assumed a more scientific shape in the recent experiments of several cultivators of hypnotism at Paris, who have succeeded in producing blisters by mental suggestion. It is nearly half a century since experimenters in America have shown that their subjects can be made instantly to show the symptoms of any disease. A fact neglected by the profession, because the operators were not physicians. These facts place beyond any doubt the truth that every function in the body is subject to mental or cerebral control. Hypnotizers have recently shown the control in this manner of the heart and the pulse.

to a solid system of life developed at a lower stage of living in the body and the nerves, — not perceiving that as life is in all cases an affair of the nervous system, it must necessarily centralize in the highest development or controlling structure of the nervous system, instead of remaining in its subordinate parts, as it is a law of the animal kingdom that with advancing development the functions diffused through the body shall become centralized in organs of greater power and superior organization. Thus the heart becomes the chief reliance for circulation, instead of the diffused capillary system, and the brain instead of the spinal and ganglionic systems, which still remain in a subordinate position, as do the capillaries in the circulation of the blood. To ignore the brain as the chief seat of life would be as unscientific as to ignore the heart as the cause of the circulation.

The materialistic physiologists who ignore the concentration of life in the brain, and suppose the spinal cord and adjacent ganglia to be the entire *sources* of the organic functions to which they hold an immediate executive relation, have reflected but little upon the absolute dependence of all upon the brain, and the speedy suspension of all when the influx from the brain is interrupted.

It is characteristic of animals to scan phenomena closely without dwelling upon or even discovering their causes, and it shows how little the general intelligence of the human race has advanced beyond the stage of animal life, to observe that in the days of Harvey almost the entire medical profession could look at the passage of red blood from the heart and the return of the venous blood toward the heart, the arrangements of its valves and its forcible action, without realizing that the heart was the active agent of the circulation, but stolidly rejecting the idea, and treating with coarse derision this simple and manifest discovery.

Is it not the same intellectual incapacity to-day which hinders the recognition of the paramount power of the brain as the seat of vitality, and prevents the consequent direction of investigations to discover the locations, the laws, and the philosophy of life in the seat of its existence, by comparative development as illustrated by Gall; by accurate pathological investigations of psychic as well as physical functions; by the study of the marvellous facts developed by the cultivators of animal magnetism; or by my own method of vital excitation of the brain and psychometric exploration of its functions.

The method of Gall (studying comparative development in men and animals) was eminently rational, and no one has ever followed that method as a student of nature without realizing that Gall had made many important discoveries. But his method was abandoned

by the profession generally, for no reason, apparently, but its aversion to psychic studies. His inaccuracies were treated as falsehoods, and a host of frivolous objections were brought forward, the majority of which were based on ignorance of the subject and ignorance of the doctrines of Gall — and under such influences the present generation of physicians has become confirmed in the prejudices of ignorance against a science of which they have no valuable knowledge.

Hence it was that my demonstrations of the brain, before the Boston committee of physicians, before the Faculty of the Indiana State University, and on many other occasions in collegiate institutions, have produced no impression on the profession beyond the sphere of my personal presence, and the repetition of my experiments by the famous Prof. J. K. Mitchell, of the Jefferson Medical College of Philadelphia, produced no more impression than a sky-rocket would make on the darkness of the night.

Prof. Mitchell was a man of genius, but not of the moral courage which appreciates, upholds, and diffuses truth. He could not realize the splendor and the power of a revelation of the functions of the brain, which he knew would make even less impression upon the well-organized and consolidated mass of the medical profession than did the discovery of Harvey, which was so simple and so easily within the grasp of the humblest intelligence. Hence he ceased to speak of the subject or manifest any further interest in it, and for these forty years past, physiological instruction has gone on, blind to the greatest and most fundamental truths, the ignorance of which has had far more serious and disastrous effects than the ignorance of the circulation, for it was an ignorance of the basis of all medical philosophy, ignorance of the basis of insanity, ignorance of the philosophy of animal magnetism, and ignorance of the greatest powers of the human mind, through which all rapid intellectual progress will hereafter be made.

The state of intellectual hebetude which permits the cultivation of physiology, in the study of its minor phenomena, to the neglect of the brain, with a vague and dreamy notion that the brain, as to its convoluted structure, maintains some vague relation to psychic phenomena in their aggregate, without having, as all other nervous structures are known to have, specific functions in special structures, and without realizing that its wonderful psychic powers are anything more than results of chemical and mechanical processes, is partly the result of our miserably defective education, and partly the result of imperfect development of the higher faculties which seek and appreciate the highest truths, and cannot therefore be overcome until a higher ethical condition shall place society, or at least its teachers, on the plane of philosophy, which is far above the animal nature.

When we understand clearly that life is located in the brain and its subordinate spinal and ganglionic structures, we may inquire whether it *originates* there, or comes by influx and is replenished from the limitless ocean of unembodied life which is invisible — whether the over-soul of the universe does by any intelligible species of influx sustain and develop the life of individuals, which seems to be a fragment of the Divine nature — will, wisdom, and love.

That there is such an influx I believe, for as life is the potential element that survives the body, and is therefore distinct from all material structures, and capable of growth and development while in the body, it must have an influx distinct from the influx of food, and that influx must come from other life, or vital elements which are also distinct from matter.

Whether and to what extent this influx is a direct, immediate influx from the spirit world, or is an indirect influx by coming in as an influx of ideas and emotions from the wise organization, order, beauty, and benevolence of the visible world, or coming in with organized matter, and developing from food and air, is a profound question. To me it appears that we have both the direct and the indirect influx, and that there are potentialities in food and air which are received into the body, and combined with, as subordinate to, the higher influx which is purely spiritual. The discussion of this would be out of place here, further than to say that the healer may often use this spiritual influx for his own benefit and for that of his patient. The great positive life must be the source of all other life, controlling all evolution of life on this globe, inflowing to man before birth, and continuing through life, which influx controls the subordinate influx of light, oxygen, and food. After this subordinate influx has ceased, and the body has become unfitted for farther influx of life through the nervous system, the vitality or soul which takes its departure becomes in a far higher degree the recipient of a continued influx. The non-perception and non-recognition of this influx by scientists is no objection to its reality. The chief stars of the stellar universe are unknown and unrecognized — by the common mind, by those who have not used the telescope; and no matter how many hundred millions ignore or disbelieve the invisible influx, its distinct perception by a single telescopic mind establishes its reality.

When the laws of divine influx are studied and obeyed, there will be men and women with nobler physical forms, far less liable to disease, or to early decay and death. The study of the brain and soul will lead to that noble result.

With this hasty glance it will be apparent that I regard the brain as the source and not the consumer of life, and that we may, advan-

tageously, stimulate the brain for sanative effects, when we understand its organology. The natural stimulus of the brain, as our spiritual energies are roused in conquering obstacles, pursuing our pleasures and enjoying society, develops our entire being, physical and mental. Force of character, arising from the occipital brain, not only leads to success, but energizes and develops the body. Men degenerate when confined for twelve or fourteen hours to quiet, humble work, and deprived of the exercise of the active ambitious faculties of the occipital region. Cerebral energy is therefore an essential condition of health, and the treatment of the brain, which requires accurate knowledge, is an important part of nervauric treatment.

Having thus shown that life is ever an influx, let us look to the origin of this influx. Does life from the celestial world of life come to earth and summon from the elements the matter that it needs for an animal or vegetable being?

It does, and yet apparently does not. If life and matter stand apart, one must approach the other — life must approach, for matter cannot. But we are not accustomed to witness the process. We simply observe that life enters a small portion of bioplasm which is adapted to life by its properties and which has previously been organized by life. The life that enters is a part of the organizing life of parents which evolved both the matter and the spirit.

It is beyond the range of our present science to speak of the time when life was not on earth, and when it began to organize a protoplasm for the reception of the lowest forms of life, and to have the continuous influx by which the lower were elevated to the higher forms. This will all be understood in time, but at present we simply perceive that life occupies, at its origin, a speck of protoplasm, and that from this speck, holding in itself the invisible and incomprehensible life, all forms of life originate. The physical organism is nothing but a nidus, a starting point from which the creative power of the life proceeds to the production of the man, the animal, or the plant. And thus it becomes self-evident that an invisible spiritual power contains the potentiality of every possible living being. It builds up the structure, grows with its growth, fills it at maturity with all the powers of life, and within a limited period abandons its home, fully developed to seek another sphere of existence where the vision of the materialist refuses to follow it. He will follow the caloric which gives to steam its enormous power, when it has left the steam as powerless water, and find that it still exists as caloric in a different environment, but he will not follow the vital forces when they leave the body, nor will he listen to any testimony that they have been perceived, felt, heard, and understood after this departure.

He is willing to perceive that caloric, after its departure from steam or iron, may again appear and enter other water or iron, but that human vitality can return to impress other human forms he will not admit, though, so far as it can be established by scientific testimony, it is as well established as any fact in chemistry.

Even when standing before the facts which demonstrate the nature and power of life, the stubborn sceptic refuses to use his reason and surrender his prejudice. Huxley, the prince of sceptics, states the case thus: Speaking of the speck of protoplasm in which life begins its operations, he says: "Strange possibilities lie dormant in that semi-fluid globule. Let a moderate supply of warmth reach its watery cradle, and the plastic matter undergoes changes so rapid, and yet so steady and purpose-like in their succession, that one can only compare them to those operated by a skilled modeller upon a formless lump of clay. As with an invisible trowel, the mass is divided and subdivided into smaller and smaller portions, until it is reduced to an aggregation of granules not too large to build withal the finest fabrics of the nascent organism. And then, it is as if a delicate finger traced out the line to be occupied by the spinal column and moulded the contour of the body,—pinching up the head at one end, the tail at the other, and fashioning flank and limb into due proportions in so artistic a way, that after watching the process hour by hour, one is almost involuntarily possessed by the notion that some more subtle aid to vision than an achromatic would show the hidden artist, with his plan before him, striving with skilful manipulation to perfect his work."

But this involuntary suggestion of reason that there is a "hidden artist," a hidden power working to a certain end, the professor of materialism suppresses as easily as a dogmatic theologian suppresses any involuntary suggestion of reason which would disturb his dogmatic faith. He can recognize invisible caloric, invisible electricity, invisible actinism, invisible affinity, but invisible life he will not recognize, for it is against his dogmatic creed, and when it comes back to demand recognition in other forms he will not look, as Horky would not look through Galileo's telescope, and Huxley said the investigation was of no interest to him and treated it with contempt.

The arrogant mind which refuses to recognize the returning spirit, or listen to any evidence of its return when it enters a human body, giving to its subject while present a marvellous intelligence far beyond his normal powers, and giving to the ministrations of his hand a healing power over disease which cannot be rivalled, becomes an almost criminal indifference to human welfare and progress. To burn a library and thus deprive its readers of ready access to the

wisdom of the past is not so great a crime as to make war upon the influx of the vast stores of knowledge which humanity is realizing as it advances to the future.

These suggestions are not foreign to this volume, for the co-operation of the spirit world is the most powerful agency for increasing the controlling power of the human hand and the penetrating power of the clairvoyant and psychometric faculties. Operators who have thus been sustained and guided have often told me that the principles of Sarcognomy corresponded with the instructions they had received from spiritual sources.

Finally, I would suggest that if life is but "a collocation of the forces of inorganic matter," the larger the collocation the grander and more brilliant must be the result. The whale, the mastodon, and megalosaurus should be the grandest types of life. But if life be something entirely different from matter — a power by which matter is wielded, the larger the amount of matter the more difficult it must be for the inspiring vitality to wield it effectively and display its highest powers. The largest and most corpulent men and women would show less inspiration or mental and physical ability than persons of medium size. The man of four or five hundred pounds is never an influential element in society. The lion, the tiger, the fox, and the squirrel show vastly more vital energy than the hippopotamus and rhinoceros. The smallest fish excels the monsters of the sea in locomotive energy, and the little birds that soar in the air where man cannot follow them exhibit a vital power and brilliance in inverse proportion to size, its maximum being attained in the little humming birds; and still the power of the living organism increases as we go down to insects. If an elephant had the same proportional power it could leap over mountains or fly like a shot from continent to continent. Even among insects the smaller excel the larger in vital endowments, and, according to M. Felix Plateau, in the same group of insects the force varies inversely as the weight, both in power of traction and power of flight. Nor do the mental endowments decline with the diminishing size; on the contrary, the largest animals that exist on land or in the sea, or that ever have existed, are far inferior in psychic endowments and capacity for intelligent combined action to the little colonies of ants, and the eagle or lion shows less skill in predatory warfare than the humble little spider. It was a small man, five feet three inches high and weighing about a hundred pounds, when he began, whose armies changed the map of Europe.

Spirit perpetually struggles with matter to which it is bound: the struggle of ages is in progress to-day; and we have reason to believe that in the progress of evolution the mastery of spirit over the condi-

tions of the material world will be far greater; but at present we can look for our entire development only to that higher stage of life which is unencumbered by matter.

The discussion of spiritual life in this chapter would be regarded by the majority of scientists to-day as out of place in a work of practical science, but truth is always practical — always leads to better conditions in human life; and this especial truth is destined to become more and more important, more and more prominent in the healing art and in all social relations, as civilization advances; and it pre-eminently needs the attention and support of honorable scientific teachers at the present time, when it is so little known to the leaders of society. No one is worthy to be a teacher who looks solely to present popularity and profit, which are gained by coinciding with the educated masses, colleges, and sects. Nothing is more urgently needed for human progress than an honest, unselfish devotion to truth.

In signal contrast with the intelligible explanations of life just presented, let us see how physiologists have been groping in the dark, and either evaded this question entirely by unmeaning expressions or confessed their absolute ignorance, like Todd and Bowman, who were unable to arrive at any conclusion in their "Physiological Anatomy and Physiology of Man."

The most prevalent doctrine of the schools is that life is the product of the chemical energies of matter in its organized condition, or, as expressed by Bennett, "Our modern view of life is, not that it is independent of matter, but a condition of matter; in other words, that material substances found in the atmosphere and in plants and animals, influenced by certain forces, have peculiar properties communicated to them. These properties are the power of growth in certain directions, contractility, sensibility, and mental acts; the exercise of any one of which constitutes life." "We are as ignorant of the true nature of physical as we are of vital properties."

Notwithstanding the confession of ignorance, this is a positive assertion, that "mental acts" are produced by organized matter, a doctrine most unequivocally expressed by the American physiological author, Flint, in saying that the brain secretes thought as the liver secretes bile. Physiologists simply stare at the fact that vital functions are manifested, and that the manifestation comes from organized matter, and there they rest, in the assumption that the power belongs to the matter in consequence of organization. Prof. Bain, who has been regarded as a philosophic writer, speaks of life in his work on the "Senses and Intellect," page 60, as "*a collocation of the forces of inorganic matter*"!!

JOHN HUNTER, however, recognized the truth that "mere composition of matter does not give life," and therefore inferred that there must be a distinct vital substance which he called *materia vitæ* (matter of life) diffused through the body, which Dr. Abernethy supposed to be similar to electricity.

DR. PROUT, author of one of the Bridgewater Treatises, went a little farther, and supposed that the phenomena of life must be due to certain *organic agents* of great variety among animals and plants, "an ultimate principle endowed by the Creator with a faculty little short of intelligence, by means of which it is enabled to construct such a mechanism from natural elements, and by the aid of natural agencies, as to render it capable of taking further advantage of their properties and of making them subservient to its use."

This was a rational inference from the facts, but why could not Dr Prout go a little farther and recognize the fact that this organic agent was nothing else but the spiritual element inherited from a prior life, the departure of which at death left the organized body without a single vital power. When we recognize that spiritual element and trace its action through the brain and nervous system the explanation of life is complete.

But the suggestions of Prout were rejected as fanciful, though Muller, the German physiologist, ventured to assert almost the same thing — that there was an "organic force" in the whole constitution which generated the organs. "This *rational creative force*" (said he) "is exerted in every animal strictly in accordance with what the nature of each requires: it exists already in the germ, and *creates* in it the essential parts of the future animal." This is very true, but what *rational creative force* is there in man but that which the parent gives to the germ and which when it is withdrawn leaves the body without any vital power. The materialism which refuses to recognize the soul, and neglects the psychic study of the brain, is what has obscured the intelligence of physiologists, and left them to fall back on such vague expressions of ignorance as where Beclard calls life "the special activity of organized bodies," Lawrence calls it "an assemblage of all the functions," and Bichat "the sum total of the functions which resist death" — in which there is no explanation of anything.

The learned Prof. CARPENTER, though not a strict materialist, makes a still more blind and confused statement in his "Principles of Human Physiology," in which he says: "The source of this Vital Power is to be found, not in the organization of the being itself, but in the forces which operate upon it *ab externo*; and that it has the same close and intimate relation with the Heat, Electricity, Chemical

Affinity, and other agencies of the Inorganic world, which they have been proved to have with each other: so that just as Heat acting upon water generates Mechanical Force, or when applied to a certain combination of metals excites Electricity, so when brought to bear upon a torpid animal or upon a seed (in which the material conditions of this activity are present) it manifests itself as Vital Force." In other words, vitality is transformed Heat.

It is true that caloric is necessary to vital operations, but there is not the slightest evidence of its being transformed in the body. The food which comes in *ab externo* is equally necessary and is really transformed in the body: hence he might more rationally have made food the source of vitality. The same might be said of water, without which there is no life. The Rotifer when dried appears quite dead, but, water supplied, it manifests life: so we might in Dr. Carpenter's fashion call water the source of life, as there is no life without it. With still better reason he might have called oxygen the source of life.

Dr. Carpenter, though a very learned physiologist, was not a profound or acute thinker, but was capable of following a speculation to very absurd results, as when in following up the chemical theory of the value of food and its calorific power he asserted that starch would be a better diet than animal food for the Polar regions with the thermometer forty or fifty degrees below zero. His language was: 'A savage with one carcass and an equal weight of starch would support life for the same length of time during which another restricted to animal food would require five such carcasses."

No savage or scientist was ever silly enough to act on this theory that a hundred pounds of starch would support life and warmth as well as four hundred pounds of meat, for meat is indispensable in arctic climates. The blunder of Dr. Carpenter was owing to a mistake in his chemical calculations, which, however, has not been observed or corrected by his cotemporaries.

His error in placing the source of life in external agents was owing to that very common obtuseness among physiologists which leads them to turn away from the brain and soul, of which they know so little, and try to explain life without them, which of course results in failure and absurdity.

The chemico-mechanical theory which ignores life leads to the general reception of that most baseless theory that the combustion of carbon in the body produces muscular power, although the most extreme combustion of carbon, producing feverish heat, is accompanied by the total destruction of muscular power.

The same theory requires the assumption that chemical action in

the brain and nerves is the source of mental and nervous energy. Of this Dr. Lionel Beale, who has no superior in England in microscopic physiology, says: "The view that nerve energy is stored up in chemical compounds which undergo change during nerve action is still taught. That such an idea should be stated at all betrays ignorance of the character of the axis cylinder of the nerve itself. If we examine the axis cylinder, say of the sciatic nerve of a frog, what do we find? A firm, tough, fibrous-like, flattened band, not easily torn, and evidently consisting of a tissue of slow growth — in fact, the very last characters we should expect to meet with in a tissue prone to rapid chemical change. Neither is a structure surrounded by ten times its thickness of oily matter (myelin) favorably situated for taking up new materials and quickly getting rid of products of decay. One of the least permeable substances in the body is the myelin of the nerve fibre, and yet through this must pass all the material from the blood to renovate the disintegrated axis cylinder, if nerve action is due to such chemical change in the nerve fibre itself."

When we ignore the power of the soul and the brain we are compelled to make many such baseless assertions.

It is utterly impossible to trace vital phenomena to chemical action. The chief chemical action, combustion, produces neither muscular, mental, nervous, nor nutritive power. It is positively antagonistic both to muscularity and to nutrition. The most complete formative nutrition occurs before birth, when the chemical process of combustion has not yet commenced. Combustion simply produces heat, which is a *necessary condition* for vital processes, and when that heat is furnished in warm climates by the atmosphere, less combustion occurs and less food is needed; the demand for food is to supply the waste of the tissues, as they wear out, and an excessive supply might result in fever. And yet both mental and muscular vigor are maintained when the chemical generation of heat is so nearly suspended. If under such conditions the spiritual vitality be sufficient to check the ordinary decomposition, life may be maintained without food for very long periods, and the entire suspension of life in the well-attested cases in which Hindoos have been buried for months becomes credible.

The characteristic of vitality is that it is utterly inexplicable by any known chemical or mechanical cause. It is an original independent power, as much as our own will power, making matter move, grow, and pass through many changes to produce a definite, complex, and valuable result which never has been and never can be imitated by any other power.

This vital power has never come from any organization of matter,

either accidental or designedly produced, but has always come from a preceding vitality of which it is the continuation, which vitality has existed solely in a delicate, fluid, self-moving material, in the interior of living bodies, which has the power of taking hold of other matter and transforming it in a manner peculiar to life.

Thus are all living bodies formed, and their form is due to the character of the original vitality, for the source of which we are compelled to look along the endless line of prior life; and finding that it has never originated from dead matter, we are compelled to seek its origin in the life which exists independent of matter, one form of which, after dwelling in matter, returns to the immaterial mode of existence as the spiritual man.

Life, being immaterial or spiritual, must evidently have entered matter from the spiritual world — the infinity of which we call Divine. How, when, and where this incarnation of the Divine has occurred is a question which is not beyond human capacity. The future will reveal.

THE ULTIMATE SEAT OF LIFE IN THE TISSUES.

Life is an element of infinite freedom and versatility of action — the very antithesis of dead matter, and consequently can associate with matter only in its refined and mobile forms. Its most congenial home is in *association with imponderable elements*. In material organisms it locates *exclusively in fluid substance*, and not in compact solid material.

If the moisture of the air be condensed on a glass vessel containing ice, we obtain evidence of the vast diffusion of the minute forms of life inherent in fluids. A good magnifying power will exhibit soft amorphous transparent particles suspended in the fluid, very difficult to detect by the microscope, and another class of oval or spherical particles consisting of the soft transparent substance in a firmer membrane. The mass of structureless bioplasm constituting the amœbæ may be obtained by putting in water a small fragment of animal or vegetable matter and leaving it a few days in the light. The amœbæ may be seen actively moving without apparent organs of motion, and taking in food without apparent digestive organs. Though less than the hundred thousandth of an inch, they show active movements and change of form. The same continual movements and change of form are seen in the human mucus corpuscles or white blood corpuscles, movements originating in their substance without external cause.

The living matter of animal bodies consists of free transparent substance, or of such substance enclosed in a capsule. This transparent, structureless fluid is the peculiar substance or bioplasm possessing

life, and has the capacity for vital movements, differing from all other substances. Not merely in the amœbæ or any other definite forms do these powers exist, but wherever this transparent structureless bioplasm exists it manifests this mysterious self-acting power, and a still more mysterious control over adjacent matter, changing it from dead to living matter with new properties as the adult animal assimilates food. Moreover, it has in miniature all the properties of life — not only locomotion, digestion, and growth, but choice in the selection of its food, and even the power of preying upon small organisms as one animal preys upon another — as the snake swallows a frog — and pursuing and uniting with another organism as if attracted by love. The white corpuscles of the blood can devour bacilli, and the male spermatozoa rush on with persevering, active, and diversified movements of their tails, circular or undulatory, to seek and enter the female ovule, their eager conjunction being a repetition, on a smaller scale, of the affectionate union of the male and female to whom they belong. The "psychic life of micro-organisms," so clearly shown by A. Binet, is just as real in those simple bioplasmic elements in man, the white corpuscles and the spermatozoa. Thus life, which is fully developed in man, is everywhere in the animal kingdom essentially the same, even in the smallest bioplasmic element. In the spermatozoon it partakes of the energy or debility of the man, and carries in itself a microscopic embodiment of all his characteristics, as the acorn embodies the characteristics of the oak, and hence it acts with the characteristics of its parent in its microscopic existence as well as when that existence has been enlarged to the human type in the infant. Wonderful is the perfection with which the spermatozoon represents the man.

Bioplasm has everywhere the power which we see in the amœbæ, of continually absorbing and vitalizing other matter, and also of forming from itself solid substances, or throwing off liquid or gaseous matter, and it is the essential element of all living bodies from which all structures of animals and plants are formed, owing its origin, so far as we can trace, to prior bioplasm, since it never originates from dead matter. Each species of bioplasm has different vital properties and capacity for forming different substances. How the life residing in bioplasm determines the formation of muscle, bone, integument, nerve, etc., is still an unfathomed mystery, infinitely beyond the reach of physical science. We can learn only that life is organized power, working with a certain intelligence toward its own manifestation in matter. Our best conception of its nature is that which we derive from consciousness, as we are living beings. But when we examine the bioplasm with the highest microscopic powers, enlarging diameters 5000 times, we get an objective view of the working of this

power (of which we are conscious in our own voluntary movements) as it displays itself in the bioplasm. Dr. Beale says : "The component particles of the *bioplasm* evidently alter their positions in a most remarkable manner. One particle really moves in advance of another or around another. A portion may move into or round another portion. A bulging may occur at one point of the circumference, or at ten or twenty different points at the same moment. The moving power resides in every particle of the very transparent, invariably colorless and *structureless* material, for by the very highest powers only an indication of minute spherical particles can be discerned. Because molecules have been seen in some of the masses of moving bioplasm, the motion has been attributed to these. It is true the molecules actually move, but the living transparent material in which they are situated *moves first*, and the molecules are carried by the currents into the extended portion. . . The movements of bioplasm are totally distinct from *contractility*, as manifested by any form of muscular tissue, since they take place in every direction and every movement differs from the rest." Thus its vitality belongs not to an organism, but to all its particles, molecules, or atoms independently. The psychic capacities of ants and of many minute insects show that infinitesimal particles of living matter may have high psychic capacities.

How this active bioplasm produces the structures of the body is explained by Dr. Beale as follows: "Men and animals, all their tissues and organs, their forms and structures, result from series of changes which commence in a portion of matter too minute to be weighed, which is perfectly colorless, and which appears perfectly structureless. Even if the particle of bioplasm be magnified 5000 diameters, not the faintest indication of fibres or particles exhibiting any special arrangement — in fact, not a trace of anything having structure — can be discerned."

"The speck of living matter, however, absorbs certain substances, and increases by assimilating matter it selects, and changing it into matter like itself. Thus it gradually *grows*, and where it has attained a certain size, perhaps one two-thousandth of an inch in diameter, it divides; or small portions are detached from it, each of which grows like the primary particle, and in the same way gives origin to successors from which tissues are at length produced. Form and structure result from the death of the bioplasm, and no matter that is alive possesses either." (Protoplasm, p. 302.)

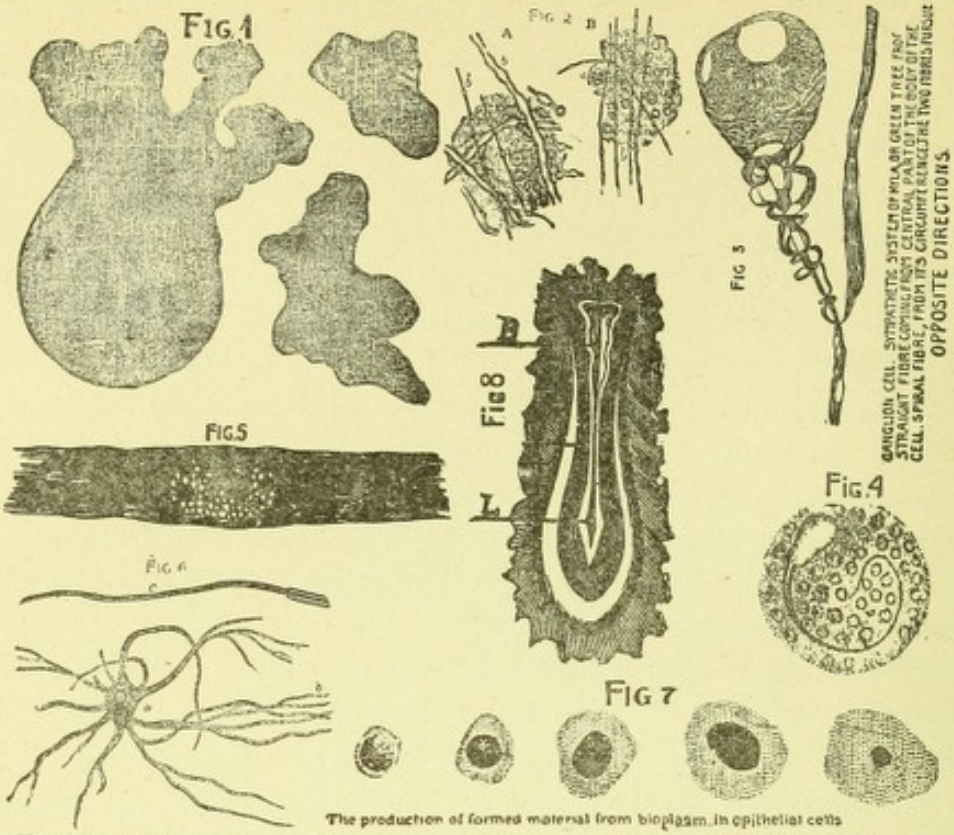
Thus the solid tissues of the body are, as it were, the apparatus vitalized by the unseen bioplasm, which is itself but fluid matter inhabited by life, itself a power as intangible and mysterious as gravity. The structures which it forms by developing cells, and the glob-

ules and fibrillæ of the nervous system, through which it controls our voluntary movements, are illustrated in the following sketches. (See Plate of bioplasm and nerves.)

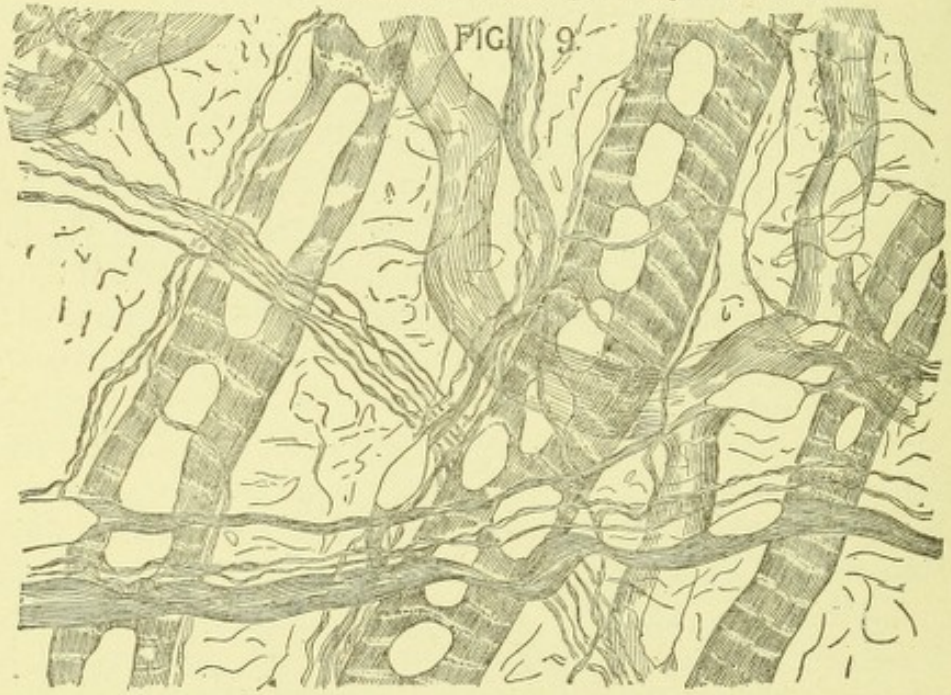
In these we see that the ultimate relation of nerve to muscle is simply that of contact, and consequently that the transmission of the vital force of volition, which moves the muscle, is simply the passage of that force or influence from one fibril to another — substantially the same fact as that against which medical dogmatism battles — the passage of human nervauric influence from the hand of the operator to the subject, by which so many vital influences are produced, and muscles are contracted. The same thing is seen in the brain, the spinal cord, and the ganglia. A great number of the ganglion globules or cells of various degrees of maturity, which abound where large nervous masses are found, have no fibrous or tubular connections, and consequently exert their influence only by contact with the delicate fibrillæ and nerve tubes among them.* "It is most probable" (says Solly) "that the nucleated cells of vesicular neurine are the active agents in the production of nervous power." Yet, if these produce a nervous power to be transmitted to the body, it must pass by contact, as they are isolated from the nerve channels which connect with the caudate vesicles and may be traced in their downward course. I think it quite certain that influences are continually passing through the body for which we cannot trace definite routes; and the power transmitted by the nerves traverses a homogeneous semifluid substance, not as a liquid or gas, but as an indefinable power transmitted by contact or continuity of substance. What right have we to suppose that this transmission of power is abruptly arrested at the surface of the body? All sensitive persons know by their personal experience that it is not.

As the search for life ends in the mystery of a bioplasmic fluid, so does the search for its principal seat in the nervous system end in a delicacy of structure which is beyond the reach of the microscope. In the lowest organisms the nerve substance is beyond discovery — even leading some physiologists to suppose that it is diffused through the substance of the body.

* These detached cells are an exception to the general structure of the nervous system, and are supposed to be germinating cells not yet sufficiently developed to display fibrous connections.



The production of formed material from bioplasm in epithelial cells



Distribution of finest nerve fibres which result from the division of dark-bordered nerve fibres to the elementary muscular fibres of the thin mylo-hyoid muscle of the hyla or green tree frog. The diameter of each muscular fibre is less than that of a human red blood corpuscle.

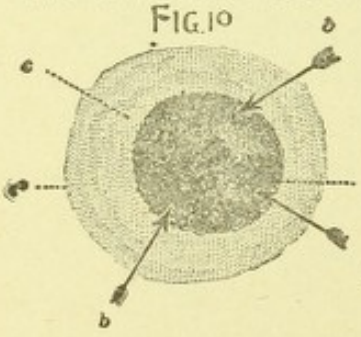
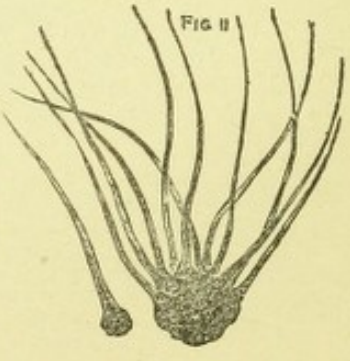


PLATE I

BIOPLASM AND NERVES



DESCRIPTION OF THE PLATE — BIOPLASM AND NERVES.

In Fig. 1 we see minute living amœbæ magnified five thousand times, pictured in one of their momentary forms. If photographed every minute no two photographs would be the same, for every portion of their substance moves independently, like the individuals of an army; and this internal living motion belongs in like manner to the white blood globules of man, the pus corpuscles and the mucus corpuscles, so long as they are alive, showing that vitality is intimately combined with every portion of *living* matter.

In Fig. 2, A and B show the mysterious structure of the cerebellum. In A the letter *a* indicates a round ganglion globule containing a little nucleus, and *b* refers to the delicate nerve-tubes. These structures lie in a bed of fine granular matter, containing many nuclei. These are from the interior of the cerebellum. The surface structure of the cerebellum is shown in B. *a* refers to a ganglion globule not so large as that in A, for the structures at the surface of the cerebrum and cerebellum are much finer than those in the interior, which connect with the muscular system of the body. The granular matter with nuclei appear as in A. Coarseness of structure in the nervous system is found in the muscular nerves and the central portions with which they connect. Sensitive structures are finer, the emotional and intellectual finest of all.

In Fig. 3 we have a ganglion cell of the green tree-frog, from its sympathetic or involuntary system, showing a complex organism, acting like a little brain upon the straight fibre and the *spiral fibre* which it gives off. This little cell controls and sustains the parts that it supplies more wisely than it could be done by voluntary action. Life would be impossible if its processes were not sustained by involuntary action,— but what does science know to-day of these involuntary processes.

In Fig. 4 we observe the origin of life as near as we can approach it,— the development of a spermatozoon, a possible future animal (after Wagner), occurring in the vesicle of evolution, but we learn nothing of the power that forms it. Life remains a mystery.

In Fig. 5 Dr. Beale shows the origin of tendon from the central bioplasmic substance that forms it. We know the process exists, but we do not understand it. We simply know that a certain soft or fluid material has organizing power.

In Fig. 6 we have a nerve vesicle, called caudate, because it has many branching processes running off to minute filaments which are like the interior portion of larger tubular nerve fibres, one of which is seen in the figure. This vesicle is from the posterior horn of the gray substance of the spinal cord. It shows the complex radiations and connections of nervous matter, which are still more numerous and much finer in the brain.

In Fig. 7 we see, as in Fig. 5, the formative element or bioplasm existing and operating in epithelial cells, the formed material increasing as the central bioplasm is consumed in making it.

In Fig. 8 we learn something of the origin of our own lives. In the germinal membrane appears a roundish spot, where two membranes are in contact, a serous and a mucous layer, the former to develop the nervous and muscular systems, the latter the digestive organs. The central portion of the germinal area becomes a pellucid area, in which appears a delicate line, the *primitive groove*, appearing in the serous layer. This is the beginning, and at this beginning we find one end wider than the other; at this end the head is formed. Cells are developed on each side of the primitive groove, making what are called the dorsal laminæ. They form a tube for the head, in which appear its three essential parts, or germs of cerebrum, cerebellum, and optic lobes.

The first appearance of the nervous system, the "primitive trace" in the serous membrane, is a "delicate and pale-white line rising somewhat above the general surface of the germinal area; the thicker portion is destined to become the head of the embryo." The spinal cord and rudimentary brain are thus developed at the beginning of life, the origin of the brain being at three positions, the *medulla oblongata* from which comes the cerebellum, the inferior ganglion which originates the cerebrum, and retains the name of *optic thalamus* and *corpus striatum*, and the intermediate body, the *optic lobes* or *corpora quadrigemina* which are the largest part of the brain of a fish, but decline to a very small size in man.

The figure which is here presented as giving the origin of the nervous system is taken from Bischoff, and shows the parts magnified eight times. We learn from this the dominating priority of the central nervous system, the structure in which conscious life resides. The letter B refers to the brain and L to the lumbar enlargement of the cord. The spinal cord is first completed at the middle of its length.

In Fig. 9 Dr. Beale has shown the wonderfully minute distribution of fine nerve filaments among the muscular fibres of the frog, which are less than the three

thousandth of an inch in diameter. The fine nerve filaments would appear less than the twenty thousandth of an inch. There is no union or plunging of nerve filaments into the muscular fibre, and consequently, when we consider the nervous influence that produces muscular action, it is proven by minute anatomy that this influence is something that *passes from the nerve fibre to the muscle fibre.* This passage of nerve currents, like currents of electricity in the nerves and beyond them, is an important principle in physiology, which is the basis of the revolution in physiology that my experiments establish, and the wilful ignoring of this truth is what has paralyzed the progress of biology in its higher realms.

In Fig. 10 we have Dr. Beale's explanation of the fundamental fact of life and growth. A formed cell is displayed with its centre of living matter or bioplasm. Toward this centre of life the liquid pabulum flows in as indicated by the arrows, and becomes vitalized; *a* refers to the bioplasm, *c* to the fresh-formed material, and *c** to the exterior material of older growth. This is the philosophy and mechanism of all growth. But science has yet to reveal why we grow at all, and why we cease to grow. That is a matter of vitality, and the world's scientists stop at the margin of vitality, either resting in contented ignorance or indulging in stupid mechanical conjectures. I am not content with this ignorance, but having approached the citadel of life, I affirm that it can be entered by the path of Psychometry. We can but say at present that dead matter is vitalized by *contact* with the bioplasm, and the same principle is illustrated, on a large scale, by the manner in which a healthy living person imparts vitality by contact to an invalid.

In Fig. 11 is presented another illustration of vital mysteries, the CILIA, which by their ceaseless movement defy all explanation. Dr. Beale traces their connection with a bioplasm at their base, thus showing that their motion is but another illustration of the well-known property of bioplasm, voluntary or self-originated action. Life is the moving power of the animal and vegetable kingdoms, and the inscrutable divine life of the universe is the supposed source of all its movements.

The wonderful forms assumed by the nervous substance, and the vast variety of structures produced by the bioplasm, evince its possession of a creative or rather organizing power which implies *independent* action or motion in itself, a perfect autonomy inherent in its nature. Dr. Beale says: "It must, I think, be admitted that there is a great accumulation of evidence in favor of the general conclusion that *all living matter possesses a power of movement.* It seems to me that not one step in growth can be explained unless the particles of living matter move by virtue of some inherent force or power, which acts independently of, and is capable of overcoming, the force of gravitation. The movements of living matter have been observed in many of the lower forms of living structures. I have described the phenomenon as it may be seen in the mucous corpuscles and young epithelial cells of the nasal and bronchial mucous membranes, and although I have not seen the movements in the living matter of the tissues generally, there seems to me the strongest evidence that such movements actually occur."

The mysteries of life recede as we approach. When we look at the minutest nervous structures, the microscope reveals a complexity of structure which still excites greater wonder. A fully formed ganglion-cell from a ganglion in the sympathetic system of the common frog (see Fig. 3), looks as mysterious and inscrutable in structure and operation as the human brain. The spiral fibre comes from the circumference of the cell and has its own destination. The straight fibre comes from the interior of the cell, and proceeds to an opposite destination. The straight fibres that pass through cells are not merged in their substance, but pass through the soft bioplasm which surrounds and vitalizes them.

These mysteries lie beyond the present instrumentalities of science, but not beyond the reach of Psychometry; and could my life be prolonged for another half century of investigation, I might safely promise a solution of many of these mysteries which the microscope cannot solve, for structure does not reveal function.

The ganglion, with its extension of fibres, reminds us of the relation of the brain and spinal cord. There are myriads of these microscopic brains throughout the body,

sending their commands through their dependent fibres, and Dr. Beale informs us that "every nerve-cell, central or peripheral, has at least two fibres in connection with it." By them it maintains its central and peripheral connections.

The mystery of vital action lies in the influence carried by the infinitesimal fibrils from the ganglion. There has been great obscurity as to the relative powers and participation in the processes of life of the spinal and ganglionic systems. They have been regarded as essentially distinct, one voluntary and the other involuntary; but that distinction is not absolute, as the mind controls organic life in a *slower manner*, producing conditions of disease in health (even producing in some cases stigmata).

Moreover, their fibres are inextricably commingled, so that we cannot determine how the partnership is conducted, and one class appears to be capable of substituting the other, as in serpents the alimentary canal, instead of depending solely on the ganglionic system, is supplied from the spinal cord in its lower, and from the pneumogastric in its upper portion. Dr. Beale has made the most minute observations, describing fibres not exceeding the sixty thousandth of an inch in diameter, claiming that others exist too fine to be detected by the microscope, and showing the distribution of nervous filaments around arteries as small as the eight hundredth of an inch. Dr. Beale has seen in the frog the same nerve supplying both the artery and the voluntary muscle. That these fibrillæ were in any way different he did not discover; they appeared the same. In short, we can only say at present that the nervous system presents varieties of perfect and imperfect conductors for our spiritual energy, *none excluding it entirely*.

When we consider the power of life as demonstrated in bioplasm, and trace that power to the brain and soul, we are prepared to recognize the importance of the vital power as the most important agency known in therapeutics, the proper introduction of which will be the most benignant innovation ever made, incomparably more valuable than anything that has been done heretofore.

CHAPTER IV.

SARCOGNOMY — GENERAL VIEW.

Definition of Sarcognomy — Its origin — Why do we recognize psychic influences in the body — Contrary to prevalent medical doctrines — The misdirected energy of the medical profession — Incapacity of the colleges for psychic investigations — The body has no psychic functions in man — Conscious life in the brain, physiological processes in the body — Soul controls both — The triple reaction is the process of life — Vagary of Leibnitz — Failure down to the present age to investigate these problems — The five great reasons for the failure — Ruskin's view of it — Gall and Swedenborg — Purpose of this work — Necessity for Sarcognomy — Its bases, philosophical, physiological, pathological and experimental — The triune sympathies — Illustrations of Sarcognomy — To be treated only as a basis for healing — The three methods — Indications of impressibility — Psychic treatment — Manual treatment on brain and body — Correspondence of soul, brain and body — General statement and directions for operating — Laws of location of the organs.

THE word SARCOGNOMY was coined in 1842, as the name of the new science which arises from the discovery of the compound psychic and physiological character of the human body, revealed in the experiments in which I ascertained that the same psychic and physiological effects which I produced on the head could be produced on the body.

Derived from *Sarx* or *Sarcos*, flesh, and *Gnoma*, an opinion, it means *etymologically* a knowledge of the flesh, or recognition of its character and relations. Practically, as the name of a new science, it means a knowledge of the physiological and psychological powers which belong to each part of the body in health, in excitement, and in disease, and consequently an understanding of the correlation of soul, brain and body.

I had discovered in the human body its pervading and controlling influences exercised through the nervous system, and recognized at its surface as physiological and psychological, by experiments made in 1842, and published by my lectures, by the *Journal of Man* and "System of Anthropology" — and applied by myself and pupils in the treatment of disease.

But why do we recognize psychological influences at the surface of the body? The life forces of the body as heretofore understood are solely physiological; and physiological powers are regarded by the materialistic school, which predominates in the medical profession to-day, as mechanical, chemical, and electrical — resulting from the same elementary forces which belong to the mineral kingdom, which is void of life. Hence there can be nothing psychic in the body, nor

anything which (according to the leaders of the old-fashioned portion of the medical profession) will not ultimately be resolved into chemical processes.*

We do not affirm that the human body *per se* performs any psychic function, although the voluntary action of the body of an alligator after decapitation would seem to indicate the presence of a psychic or conscious element, which, as we descend in the animal kingdom, is less concentrated in the brain.

In man is verified the general law of the animal kingdom, that functions are more centralized and separated as we ascend in the scale. The psychic faculties are concentrated in the brain, and there is no conscious sensation or perception in any part of the body, until the impression originating there has been conveyed along some nerve to the brain. As sensation and perception are thus realized in the brain, and never without its co-operation, it would appear erroneous to locate them in the body at all. The body, however, is the seat of physiological processes, and the brain of conscious life, which operates upon and through the body, and the soul is life itself, which operates

* Hence the physiological zeal of the medical profession to-day is directed mainly to the chemical processes and laws which are manifested in living bodies — the consequences of which will continue to be, as they have been, an immense addition to our stock of chemical knowledge, accompanied by an immense neglect of the science of life, and an increasing *intensity of ignorance* of true vital science, which is sadly impressive to one who understands the psychical elements of humanity. In looking at a trained pugilist, athlete, gladiator, or acrobat, we are impressed with admiration of their superior physical powers, but when we come to know them as men and look for something more than skilful muscularity we feel a great disappointment. So when we look at the achievements of the medical profession in the physical sciences connected with man — their vast accumulations in anatomy, minute histology, chemistry, pathology, mechanical and chemical physiology and comparative biology, we are profoundly impressed with the greatness of their extremely laborious investigations and achievements in the physical sphere; but when we come to the ethical sphere, to the achievements of the science as a benefactor of humanity, we are painfully impressed with the slowness of progress and the stolid neglect or active hostility which have been displayed toward the noblest work of medical philanthropy — the healing of the sick by new remedies and new methods; and although this barbaric insensibility has greatly diminished within fifty years, there is still enough to maintain a fierce hostility against the only method of medical practice ever discovered which is incapable of doing any harm by its own curative agency. This digression naturally comes before us when we realize that the preoccupation of the mind by exclusive physical science and by the dogmatic conviction enforced by all surrounding authority, that nothing but physical science has any reality, establishes a mental condition totally unfitted for the study of life which is not physical, and of its laws, which are widely distinct from those of the laboratory, as much as a life of pugilism would unfit one to cultivate and practise the Christian virtues. Thus, as national wars have prevented the growth of true religion, so does a *dogmatic and intolerant* materialism, pervading every department of scientific education, disqualify for vital and psychic studies, although physical science *per se*, in its proper place, and unaccompanied by dogmatism which sneers at evidence, is entirely harmonious with and beneficial to the cultivation of the higher departments of science. I do not, therefore, anticipate any proper investigation of my own scientific discoveries by the scientific societies or universities generally until they have undergone such a change in their dominant spirit as will probably require a century for its accomplishment. When that time arrives — when thousands of investigators, in a philosophical spirit, shall carry on those investigations which adverse circumstances have not permitted to myself — the brilliance of that era will contrast with this century as *it* contrasts with the middle ages of Europe.

through the brain, and through the brain reaches the body, in which its impulse and influence are manifested, as when an emotion or passion of the soul, such as love or anger, working through the brain, makes its expression in the body, by the voice, the actions, and the circulation of the blood.

The process of life, however, is not merely action of the soul on brain and body, for the conditions of the body in health and disease continually react on the brain and soul, and under the influence of alcohol, or of fever, the psychic action is entirely changed. The mind and character are thus modified by the conditions of the body, and all life is the reaction between soul and body, through the brain, the grand centre in which we find and interpret all the powers and principles of Psychology and Physiology. Hence no physiological process or condition exists in the body without something corresponding thereto in the brain.*

Familiar as this reaction or sympathy has been to all mankind, and forcibly as it has been exemplified in the processes of disease, under the daily observation of many thousand physicians for many thousand years, I know of no systematic attempt to bring this chaotic mass of phenomena under the jurisdiction of science. It has always appeared to me very remarkable that men of scientific and literary pursuits should be so entirely and passively content in ignorance of the boundless worlds of surrounding truth yet unexplored, even when these truths are a part of their daily and hourly experience. For this there appear to be four evident reasons. The engrossing necessities of subsistence, of labor, business, pleasure, and ambition leave the multitude little time for even serious thought upon the mysteries of life.

Secondly. The engrossment of ambitious minds in their immediate environment, and the consciousness of their own energetic capacities and success, give them a feeling of self-sufficiency, an exalted idea of their own attainments, and a habitual unconsciousness of the infinite realm of the unknown upon which we have made so small an encroachment. Thus arises a tacit notion, expressed in acts but seldom in words, that we have nearly attained the boundaries of the knowable, and that attempts to explore new regions originate fanciful delusions, scarcely worthy of serious attention, as there is nothing very important to be discovered.

Thirdly. As the engrossing pursuits and delusive ambitions of

* Of all the baseless speculations of metaphysical philosophizers, the greatest departure from the truth was the doctrine of Leibnitz that there was no reciprocal influence between the soul and body: "Everything" (said Leibnitz) "takes place in the soul as though there were no body, and in the body everything takes place as if there were no soul."

our leading people produce a state of mind unfitted for the exploration of the unknown, this disability is vastly increased by our systems of education, which utterly fail to develop invention, originality, and power of independent reasoning. Hence the few fitful efforts to investigate and explore are generally profitless, and productive of crudities or delusions, and the feeling is fostered that the unknown is chiefly the unknowable.

Fourthly. A dominating love of scientific and philosophic truth for its own sake is a rare quality, and seldom strong enough to induce any one to devote himself to the unknown, when the result of success is the development of existing error and ignorance, offending the vanity of the entire class of teachers and leaders, and isolating the discoverer from the sympathy and fellowship which are essential to success in all pursuits. In all professions and classes the existing state of opinions is maintained not only by that *immense power*, the inertia of fixed habit, but by an unyielding hostility to innovation. The medical, clerical, and legal professions, and the business classes also, furnish so many illustrations of this, that a very instructive volume might be made by a periscopic view of the steady warfare against truth and its discoverers throughout all the historic ages — a warfare still maintained with energy, though the battle-fields are changed, and the soldier, jailer, and executioner have little to do in the modern processes of freezing and drowning unwelcome arrivals from the Divine sphere of wisdom.

Fifthly. In all ages the spirit of dogmatism has made men unfair and intolerant towards all opinions but those into which they have been educated, or have been led by passion and prejudice. At the present time materialism rules, and the scientific classes imbibe it in their education unconsciously. Hence there is a prevailing disposition to ignore everything that is not materialistic, and to meet the profoundest truths with that supercilious contempt which prevents all candid investigation. Biological questions are studied in so one-sided a manner as to justify in some cases the sarcasm of Ruskin that scientific men have so contracted modes of thought that "if beyond this safe and beneficial business they ever try and explain anything to you, you may be confident of one of two things, either that they know nothing (to speak of) about it, or that they *have only seen one side of it*, and not only have not seen, but usually *have no mind to see the other*."

Such are most apparent explanations of the remarkable fact that now, near the end of the nineteenth century, no one has yet attempted to explore and describe the triune constitution of man — the union of soul, brain, and body, and the laws of their vast and various sympa-

thies and interactions, which are of so grand importance not only in Medical Philosophy and Therapeutics, but in Hygiene, Education, Mental Philosophy, Ethics, Æsthetics, Sculpture, Painting, Forensic and Dramatic Eloquence, and last, not least, Pneumatology. These remarks apply of course to the prevailing doctrines of science and philosophy — to what is recognized in the Universities. I do not refer to the bold exploration of the brain and its psychic functions by Gall, nor to the still more extraordinary scientific doctrines and speculations of Swedenborg, both of which the colleges have laid aside without investigation, and neither of which has grasped the entire problem of the triune constitution of man.

The warfare of theologians against scientific progress has been grandly illustrated by Andrew D. White, late president of Cornell University, in his essays on the "Warfare of Science." That hostility still exists, and works in co-operation (strange to say) with the dogmatism of the most resolute opponents of both theology and religion. The narrowness of theologians and the narrowness of physical scientists (arising from the ignorance of both) makes them equally hostile to the profound philosophy which deprives both parties of their bigotry, bringing science and religion, and consequently scientists and theologians, into harmonious accord.

Why do the representatives of theism and of atheism unite in hostility to new truth and almost forget their own antagonism? If the truth must be spoken, the one party is not truly religious and the other is not truly scientific, for both religion and science demand the pursuit and the eager acceptance of truth. The profound physiologist Dr. Lionel Beale expresses his views as follows: "Those who have started upon the scientific pilgrimage, and have made up their minds to encounter the well-known hardships and disappointments, and have determined to bear the poverty of their lifelong journey, have not received the blessings of any church to encourage their hopes or to lighten their burthens. No miracles have been performed for them. No shrine has been pointed out where they may place their offerings and then return home to rest in peace. They must work on as long as power remains to them to work, and patiently endure to the end. No church is interested in their trials or takes any account of their virtues. And this must be, since science can never bow to authority, submit to the arbitrary dictates of any earthly power, or consent to be governed in her progress by any time-honored rules. Science asks only to be permitted to work on. She longs neither for honors, nor wages, nor power."

"Happily the interrogators of nature may henceforward pursue their work without fear of being interfered with by religious societies

or teachers. I wish it were equally certain that scientific men would never have to suffer injustice and tyranny at the hands of arbitrary and arrogant representatives of science. It is in writings called scientific that the true spirit of intolerance is occasionally observed to breathe, nowadays, and scientific individuals and scientific minorities have occasionally suffered injustice at the hands of fellow-workers." (Beale on Protoplasm, Matter, and Life, p. 335.)

The largest and most thoroughly organized body of scientific men is that which belongs to the medical profession and is controlled by the medical colleges, which sustain the relation of Alma Mater. These are organized in the American Medical Association, upon as rigidly proscriptive principles as ever animated the theologians. The most forcible expression of this intolerance was that made by a surgical professor in Kentucky when he claimed that the clergy were fully equal to the doctors in liberality, for the latter believed that Homœopathic physicians should be allowed to practise only in the penitentiary and upon each other.

So notorious and so pragmatically bitter has been this collegiate hostility to innovation and innovators, that I have never, except in one instance, attempted to interest a collegiate faculty in scientific demonstrations. That attempt, made in my twenty-seventh year, though sustained by the Board of Trustees and the professor of Physiology, at Louisville, succeeded only in proving that there was but one member of the Faculty who could be induced to give the subject any attention.*

As this attempt was nearly half a century ago, it is possible that there may be to-day in the colleges a small percentage of men who have a share of the spirit of progress. But little is to be hoped from a body of men so profoundly miseducated, and associated together upon false principles, sustaining the so-called professional ethics (?) of the code of the National Medical Association. There could be no clearer statement of its essential spirit than the frank declaration of Dr. W. A. Hammond, of New York, in the form of a novel,† that the motives of physicians in the practice of their profession were *entirely selfish*

* A member of this Faculty, Professor Gross, was subsequently generally recognized as standing at the head of the profession in America, and in that position politely assured me that the Association would never take any steps to investigate anything that I might discover, because they were governed by *their code* and I was not.

† A character in the novel is made to say: "It is my deliberate opinion, based on a very careful study of doctors, that they don't care any more for the poor or for humanity in general than I do, and that is not much, I assure you. As to Dr. Arndell, I believe that for humanity in the abstract he has the most supreme contempt. He and others like him are willing to help humanity, but they do it for the sake of their science, not from any love of the human species. Of course, the race is benefited, for whatever advances medical science helps mankind, but that is not the primary object of the doctors."

— a confession which justly represents the large class who sympathize with him, but which a better class would indignantly repudiate. The power of such a class, in presiding over medical instruction, to debase or demoralize the incoming members of the profession is self-evident, and its results are widely seen.

In this book I propose to present but one of the many aspects of Sarcognomy, viz., its therapeutic utility, and the instruction which it gives us in reference to healing the human constitution by the hand, the electric poles, and the various external applications which produce different effects as they are applied to different parts of the body, for every physiological as well as every psychic function has a special portion of the surface through which it may be reached and excited.

A knowledge of the physiological and psychic forces or influences connected with each part of the body is as necessary to judicious treatment by Electricity as Anatomy is to surgery; and the present state of Electric Therapeutics may be compared to the condition of surgery at the siege of Troy, anterior to anatomical dissections.

Equally necessary is it as a scientific basis for Nervauric practice of what has been called Magnetic Therapeutics or treatment by Animal Magnetism, and for the blind, clumsy processes called Massage, which have arisen from a sense of the necessity of manual treatment, and have been adopted in ignorance of the neurological laws of vitality, as well as disregard of the extensive experience of magnetizers during the last hundred years.

The philosophical basis of Sarcognomy is the threefold constitution of man, and the very intimate sympathy and parallelism of soul, brain, and body, which enable us, through either of the three, to affect the other two in a corresponding manner.

Its practical physiological basis is the fact that the exercise of every psychic faculty, emotion, or impulse produces a characteristic and definite effect on the body, as well as in the brain, while the exercise of any portion of the body produces a characteristic effect on the brain and mind, the locality of which can be specified on the brain.

The pathological basis is the fact that every disease of the body affects the brain and produces a particular and distinct effect on the mind, so that diseases have a mental as well as a physical symptomatology, which has been especially observed by Homœopathic physicians.

The experimental basis is the fact that in applying the hands or fingers upon the head of an impressible person, under proper conditions, we stimulate the subjacent portion of the brain, and rouse it to

the manifestations of its functions with a vigor proportioned to the impressibility, the physiological and psychological results being a complete development of the cerebral functions (the discovery of which I made in 1841) — and that the application of the hands on the body produces the same evolution of the physiological and psychic functions as the application to the head at the corresponding locality — the discovery of 1842.

Thus the entire surface of the brain corresponds to the entire surface of the body, maintaining therewith an active sympathy in our experiments, precisely as it occurs in the progress of diseases and local excitements. The facts of disease sustain the localization of Sarcognomy, and the map of Sarcognomy explains the philosophy of disease.

Sarcognomy is also illustrated by the laws of development, by natural language or gesture, and by the intuitive judgment which arises in our minds on seeing different forms which express different characters — the whole person being as expressive as the face to close observers. When we contrast Venus and Hercules, Jove and Apollo, or Washington and a degraded sot, a lion and a lamb, or greyhound and hog, we realize that the entire form is an embodiment of character.

Putting aside the pathological, philosophical, and physiognomic aspects of the subject, I propose to treat Sarcognomy only as the basis of the practical art of healing.

In acting upon the triple combination of soul, brain, and body we may fix our attention as appears best on either one or all three.

If the constitution is highly impressional (manifested usually by breadth and height of the front head) mental influence will be efficient, and the nervous system will respond readily to nervauric treatment. This impressibility is greater among the natives of warm climates, greater in summer than winter, and generally greater in females than in males. Breadth of the temples from right to left and largeness of the pupils of the eyes, with fullness of the upper part of the face, are favorable indications.

A simple method of testing this impressibility is to pass the ends of the fingers close to the open extended hand of the patient, who, if impressible, will feel a slight coolness at each passage of our fingers. When this occurs, we may be sure that the application of the hands on the body or head will be effective. When the fingers are thus passed slowly, no breeze is produced, and simple sensibility would feel the *warmth* radiated from the hand. A feeling of coolness is produced only by an impression on the nervous impressibility.

I recommend the application of the hands on the body for the purpose of healing, because, the disease being located in the body and

the vital forces emanating from the spinal column, it is desirable to approach as near as possible to the difficulty that is to be removed and the seat of the vital force on which we operate.

It is true that diseases may be treated by the soul power alone, without any contact — the health, benevolence, and will power of the operator being effective without contact upon the patient, who sits near him or in some cases at a distance, if the proper rapport exists ; but in the present condition of society in northern climates it is only a small minority who can be treated in this way.

Contact is generally necessary to efficient treatment, as it is to efficient contagion, and it is too evident for argument that the farther apart two persons are placed, the less effect they can have upon each other.

The contact of the hand with the skin is therefore desirable for the most complete effect, and the fewer the garments between the hand and the patient, the better. Nevertheless patients are successfully treated without removing any of their clothing. The vital influences emanating from an operator are more diffusive in proportion to their subtlety, and while caloric and electricity are resisted by clothing, the subtler forces, which reach to great distances, are not hindered. Operators in whom these subtler forces are abundant, and who produce effects without contact, are not hindered by clothing ; and static electricity, which like the nervous forces plays upon the surface, also produces its effects through the clothing. There is a class of patients who realize the effects of the hand when it is not even in contact with the clothing, and a class who feel the influence, not only of persons at a distance, but of their departed friends, and even the ancient inhabitants of the spirit world. If such facts are unknown to physical scientists generally it is because they shun psychic phenomena.

In operating upon the body, we have the advantage that we may use percussion, friction, and dispersive passes — the friction and percussion not being appropriate upon the head.

Effects produced on the body are local and physiological, but *become psychic* in proportion as the brain sympathizes with the spot. In persons of a low grade of susceptibility there is less sympathy between the mind and body, and operations on the body do not produce the *distinct* psychic effects which occur in the impressible.

Effects produced on the brain are mental and become physiological only as the cerebral influence extends to the body. But as the brain is the controlling organ, it is obvious that it may produce any amount of physiological action ; and forty years ago I operated chiefly through the brain, being interested in demonstrating its physiological powers. When we wish to do all that is possible, we should operate

on body, brain, and soul, treating the latter by our own psychic force of will and emotion, with a resolute desire to cure, and rendering the individual as passive as possible by the methods I shall explain. The desire to heal, born of love, is the healing agency, and the force of will or occipital energy is the power that subdues the patient to passiveness — a power which may exist without a high degree of healing capacity.

Correspondence of Soul, Brain, and Body.

When we make a map of the cerebral organs and understand their relative positions, we are well prepared to understand their correspondences on the body, which are very simply arranged.

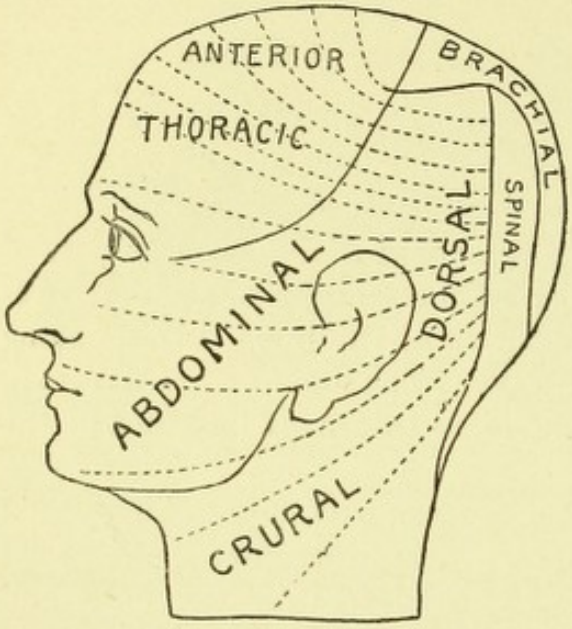
The superior part of the brain corresponds to the superior part of the body, the basilar portion of the brain corresponding to the lower half of the body — the lateral ventricles of the brain corresponding nearly with the upper part of the waist. The lower end of the trunk corresponds with the base of the brain, as externally indicated at the junction of the head and neck.

The limbs are a departure from the compact form which would most easily coincide with the head. The lower limbs correspond with the basilar region, represented or covered by the neck and marked Crural. The upper limbs correspond with the Brachial region of the occiput, which starts from Firmness and extends down the middle of the occiput, embracing the regions appropriated to Ambition, Ostentation, Self-Esteem, Self-Confidence, Domestic Affection, Love of Power, Arrogance, and Hostility.

The superior anterior fourth of the head corresponds to the anterior surface of the thorax, and is marked Anterior Thoracic. The face corresponds to the abdominal region. The entire occipital region above the Crural, and exclusive of the Brachial, corresponds to the back, and is called Dorsal.

The spinal column being the source of the nerves that vitalize and sustain the trunk, it follows that the anterior regions of the body are related to and dependent upon the posterior regions in the manner indicated by anatomy, and as the brain corresponds with the body we must infer that the posterior regions of the brain have a like dominant influence over the anterior. This was explained in the "Outlines of Anthropology," and especially or minutely under the head of Pathognomy, showing that each organ of the brain had by the law of its action a specific relation to a certain anterior organ. The comparison of the head with the anatomy of the body shows something similar, for the distribution of the spinal nerves anteriorly, if illustrated by a similar distribution on the head from its dorsal (and spinal)

region would appear as in the annexed engraving; and if the conditions of the head correspond to those of the body the anterior organs must be the excitants of the posterior, while the posterior sustain the vital force of the whole, bearing in mind, however, that the superior sustain the inferior organs, as vitality descends from higher to lower organs.



When we trace these lines of connection and correspondence, which we transfer from the body upon the head, we are struck with their close analogy to the lines of correlation established with exactness for the brain by PATHOGNOMY, and if the reader has been familiar with Pathognomy, which is an exact and positive psycho-geometric science, he may be as much interested as myself in observing this unexpected illustration derived from the correlation of organs in the body. In this case two independent lines of research, Pathognomy having preceded Sarcognomy seven years, arrive at a common conclusion and mutual corroboration.

To this mutual corroboration of Pathognomy and Sarcognomy may now be added an additional confirmation from the more recent discoveries of vivisection and pathology. We learn from Pathognomy (what is verified by common observation) that the lower occipital organs give great energy to the eye, as is seen in the penetrating glance of courage and arrogance. It has been shown by vivisection and pathology that there are two lower occipital regions, the injury or disease of which injures vision. The partisans of these two regions contend each for his own, but both are right, for the two regions are shown by Pathognomy and Psychology to coincide or co-operate. In like manner the upper regions of the occiput co-operate with and invigorate the rational understanding and the friendly sentiments, as the upper region of the spinal cord sustains the upper anterior thoracic regions.

A thorough understanding of cerebral science shows that the posterior regions sustain the anterior in the brain, as the posterior region of the body sustains the anterior; and that the superior region of the brain sustains the inferior, as the superior half of the body sustains

its inferior half. This sustaining power of the superior region of the brain has been fully shown by vivisection and pathology.

From this description we learn that the posterior half of the brain controls and sympathizes with the forces of life which belong to the spinal column and the entire back and limbs, while the lovely and intellectual elements associate with the breast, and the sensitive, impressional, relaxing elements coincide with the abdomen. Hence, to invigorate the vital forces, the hand should be applied to the back of the head, or the posterior surface of the body.

If applied upon the neck, it invigorates the lower limbs, sending the circulation and vital forces downwards, warming the feet and sustaining physical vitality. The organ of vitality, or rather Vital Force, is at the base of the occiput, and its correspondence at the posterior summit of the thigh. Hence the application of the hand on the back of the neck is an excellent method of renovating exhausted vitality, invigorating locomotion, and relieving determination of blood to the head and chest — effects which may be enhanced by applying the hand at the summit of the posterior aspect of the thigh, on the region of Vital Force.

When one hand is applied upon the occipital base and the neck, and the other upon the upper half of the occiput, we produce a powerful and health-giving effect, as the upper part of the occiput (corresponding with the upper half of the back) contains the most perfect sanative energy of the constitution in the organ of Health and its surrounding group. The application of the hands upon the upper part of the occiput and upon its base or junction with the neck corresponds with their application on the shoulder blades and the summit of the thighs and base of the trunk — with this difference, that a relatively larger space may be covered on the head, and if, instead of touching Health and Vitality with the fingers, we apply the whole hands, covering nearly the whole occiput, we cover a space corresponding to the entire back and arms, and thus produce a very extensive effect, rousing the entire will power and physiological energy. This can be conveniently done while the patient is lying on his back in bed. My statements on this subject rest upon innumerable experiments during forty-seven years, and their successful repetition by my students in investigations and in the treatment of diseases.

In applying the hands upon the superior anterior region of the head, which corresponds with the anterior part of the thorax, we produce the amiable and soothing influences which belong to the gentler emotions. We may proceed now in this consideration of the different regions of the head, which the unskilled may cover with the hand, and hereafter will proceed with the specialization of organs which

the skilled operator, understanding localities, may touch with the ends of the fingers, when a more special and limited influence is desired.

The influence of the anterior superior region of the brain is remarkably soothing and happy, rendering the patient entirely amiable, good natured, patient, obedient, cheerful and more impressible to the nervauric treatment. Hence it is often desirable to impress this region, to establish the best relations between the physician and patient. But we should be careful not to carry it too far, in very impressible persons, for it antagonizes the base of the occiput, in which the strong physical energies and impulses reside. These it reduces to tranquillity by a quieting and anodyne influence, but when the vital forces are very feeble, they would become too quiescent and weak under continued excitement of the anterior coronal region, the tendency of which is toward trance, or complete suspension of physical activity. The special locality in which this tendency to trance exists in the highest degree, is about an inch and a half at each side from the sagittal suture, nearly at the posterior corners of the rectangular space assigned by Gall and Spurzheim to Veneration.

While the foregoing caution is necessary in reference to those delicate, impressible constitutions in which excitement of one portion of the brain may go so far as to overpower and suppress the opposite region, it is not necessary in reference to constitutions of greater integrity, in which the brain does not become unbalanced. In such persons the stimulation of the upper surface of the brain produces the happiest effects, for it draws the vitality upwards, invigorates the brain, and renovates life at its fountain.

Of the superior organs, or upper surface of the brain, the anterior are correlative with the posterior, so that each in a normal brain tends to excite the other, as explained in the "Outlines of Anthropology" (chapters 19 and 20). Hence, the general normal effect of exciting the higher organs is not only to increase the virtuous and amiable sentiments, but to increase the general power of the brain, enjoyment of life, and the abundance of health. We know this by a threefold demonstration. 1. The cheerful sentiments, the enthusiasm, hope, firmness, and energy of the higher organs are known by all mankind to be the sustaining and invigorating elements of character. 2. The effect of stimulating the higher organs is felt by every subject as highly agreeable, invigorating and healthful. 3. The effects of disease in the upper region of the brain are destructive to health and energy — paralysis being one of its common effects, as reported from hospitals, preceded, of course, by general prostration.

Hence, in the treatment of invalids the most pleasant and satisfactory results are attained by treating the superior surfaces of the brain

and of the body, and a great number of cures have been effected by treating the higher emotions of the soul without contact with the body, or any medicinal methods. Religious emotions are highly curative, and the "divine healing" of prayer, song, faith, and other religious processes has produced many marvellous cures, for the emotions of the upper brain may be stimulated by mental or spiritual influences as powerfully as by direct action on the impressible brain. It is therefore the duty of the practitioner so far as possible to stimulate the higher powers by spiritual as well as manual means — in other words, to rouse the faith, hope, love, and devotion of his patient. To do this he should not rely upon any form of words, but should carry that faith, hope, love, enthusiasm, and resolution in his own person, from which by contagion it should go to his patients whenever he approaches them, even if he is not in contact.

This is the secret of the success of many physicians neither very learned nor very skilful. Their love is their healing power. Hence it was that Dr. Jennings, of Derby, Conn., near half a century ago, finding that his medicines did not accomplish much good, ceased to give anything but bread pills, colored powders and liquids, but retained his patients even after he had told them of the deception.

In addition to this personal potency which the physician should develop in his own moral nature, he may do much by vocal music. Songs of a cheering and inspiring character, adapted to the feelings of the patient, and skilful instrumental music, are very important aids in healing. But I must protest against any music which is merely technical, and not full of emotion, not calculated to rouse our sentiments. A great deal of our common music, including even the most pretentious, is *utterly worthless* for any good purpose. To listen to it is a waste of time.

These principles are not new. Physicians and friends generally realize the necessity of sustaining hope in a patient, and surrounding him with pleasant influences. What better influence can we have than faith in a Divine Providence, conviction that an immense love broods over and sustains humanity, and that even if our career be shortened on earth it is thereby extended into a more glorious and happy realm. The physician should cherish and diffuse such sentiments.

The fashion of mental healing by resolutely ignoring disease, fixing the mind upon the conception of perfect health, and the all-pervading benignity of the Deity, is not at all irrational in essence, though mingled with so much metaphysical nonsense in the denial of the existence of matter and existence of disease. These crazy theories, however, do not diminish the potency with which the intense optim-

ism acts as a curative power when the spiritual energy of the operator meets with impressible receptivity in the patient. Absurdity is not physically injurious, and nonsense of a lively character is rather invigorating.

Effects do not occur without causes and conditions. A feeble spirit would produce no effect upon a hard, resisting nature, but one who has a strong spirit capable of transcorporeal action will affect many, and will produce miraculous results when meeting passively impressible natures. Such is in fact the experience of this class of healers. One of the most prominent confessed that not more than one in twenty of her pupils would be successful.

The ready smile, the cheerful words, the sprightly anecdote, the affectionate manner, and the inspiring promises of the physician, based upon knowledge and experience, are appreciated by all as a healing power, and Sarcognomy shows how by special local treatment to produce additional effects beyond all that spiritual influences produce upon the mind.

In operating on the superior surface of the brain we should understand, that by the general law of organology we find stronger influences as we go back, and gentler toward the front.

If we understand the general laws of organology, we are less dependent upon the memory of special localities. The controlling principles are quite simple. The energy of any organ may be determined by its anterior or posterior position. The intellectual and sensitive organs of the extreme anterior portion of the head are not only void of physiological power, but tend to check and exhaust it when acting alone. Hence, severe injuries of the anterior end of the brain produce little or no physiological injury unless an inflammation should be produced. In the case of Phineas Gage, of Vermont, an iron crowbar shot through the head from the cheek bone upwards produced but little immediate effect, and was soon recovered from. (See my "Outlines of Anthropology," chapters 17 and 18.)

The back of the head, the extreme occipital portion, gives power and ambitious impulse. Between the posterior pole of power and the anterior pole of weakness, position determines the power, and when we think of any faculty, emotion, or impulse, we can determine its longitude on the head by a consideration of its energy. Thus Modesty would be anterior, as Vanity would be posterior. Liberality and generosity would be anterior — avarice posterior — sympathy anterior, stubbornness posterior, etc.

The latitude or height can be determined with equal ease by the proper rule, as it corresponds to the moral elevation, and thus I have taught an intelligent class in an hour to locate any faculty in its proper organ with approximate correctness.

Organs are higher in the brain as they are of a more kind, loving, spiritual nature, and lower as they are more animal, selfish, and violent. Love and tenderness are at the summit — hate and cruelty at the base. These principles have been established by innumerable experiments upon the brain in intelligent persons in their most normal and intelligent condition.

A similar law applies to the body. The vital forces are at the back. The spinal column is the commanding region. The upper portion of the back is the seat of those normal powers which happily combine the moral and physical influences, and in their greatest development produce the best results. A large development of the shoulder is the best conformation for a superior constitution, while the development of the thighs and lower part of the back gives the greatest vital force, but with less moral power and equable, healthful action. The passions and appetites are below — the nobler impulses above.

Anteriorly, above the diaphragm, we find the gentle and refining influences; below the diaphragm the sensual, sensitive, and morbific.

This general survey indicates the obvious principles of nervauric treatment. The entire posterior half of the surfaces of the head and body constitutes the tonic or invigorating region, the region of vital power, upon which the nervauric healer will chiefly expend his energies — the treatment being applied higher or lower according to the location of the disease. In the majority of cases, both upper and lower energies require to be roused, but in all cases the upper posterior region of the head and body requires special attention.

In the application of electric currents, the backward direction (towards the spine) is the most generally beneficial, and the upward currents are more extensively beneficial than the downward. In the application of massage or rubbing, the posterior surfaces of the body are most beneficially treated and are more capable of enduring vigorous treatment.

CHAPTER V.

THE SPINAL REGION — ITS ANATOMICAL, NEUROLOGICAL, AND THERAPEUTIC RELATIONS.

Duty of the healer — Necessary predominance of the upper and posterior regions — Their antagonism to the abdominal region — Upward passes — Morbid tendencies and vital relations of the abdominal region — Dispersive passes — Medical applications — Spinal region: demonstration of its importance — Treatment of intermittent fever by M. Gondret on the spine — Counter-irritation at the origins of nerves — Special endowments and increased development of different parts of the spinal cord — Flexor muscles governed by upper, and extensor by lower portion of the cord — Importance of the cephalic region of the spine — Its brachial plexus and phrenic nerve — its extensive distribution — The vertebral ganglia and arteries — Their control over vital powers explained anatomically — Electric experience of Dr. Rockwell — Resuscitation of a moribund patient through the cephalic region — Importance of the cephalic region in fevers — Testimony of Drs. Gerhard and Beard — The upper dorsal nerves and cilio-spinal region at the second dorsal nerve — Connection of the *cuneus* and *angular gyrus* in the brain with vision — Testimony of Onimus and Legros as to the cephalic region — Thoracic and abdominal divisions of the dorsal region — Pulmonic influence of the dorsal region — Cardiac region of the cord — Caries of the spinal vertebræ, as reported by Brodie, showing the functions of the cord — Pathological observations of Dr. Little — Anatomical connections of the upper dorsal region — Treatment of hooping-cough through the upper spinal region — Differences of the upper and lower dorsal region explained — Illustrations in consumption, pneumonia — Sympathies of the chest with the upper region of the brain — Influence of the affections — Illustrations in sunstroke, typhus, and insanity — Connection of pneumonia and delirium.

Relation of the heart to the dorsal and cervical regions — Illustrations of the lower dorsal region — Connection of the cephalic region with respiration and circulation, through the phrenic nerve, ganglia, and plexuses — Relations of dorsal region to respiration — Experiment of Onimus and Legros — Relation of the diaphragm to the spine — Explanation of coughs — The most effective current for stimulating the diaphragm — Control of the lower dorsal region over the abdominal functions — The respiratory tract on the abdomen — Experiments of Valentine and observations of Sherwood — Backache from constipation — Opposite tendencies of the upper and lower portions of the spinal cord — Power of the lumbar region — Experiments of Brachet on the lumbar region — Experiments of Budge — Anatomical description of the lumbar and sacral nerves — Seats of sexual functions — Observations of Longet, Breschet, and Brachet — Sacral and hypogastric plexuses — Budge's sexual centre — Connection of the sexual and muscular — Antagonism to brain in pelvic region and lower limbs — General view of the spine and its nervous control.

Correlation and combination of functions — Van Kempen's experiment — Roots of the nerves — Complex relations of the heart with ganglia, phrenic nerve, and spine — Relations of the thoracic part of the cord — Cervical ganglia and pneumogastric — Relations of splanchnic nerves — Combination of brain, lungs and stomach — Connection of cardiac and pulmonary nerve forces — Importance of the ganglionic system.

THE enlightened healer understands that he must not merely remove the existing disease and the morbid elements in the body, which was the general aim of the drug practice (operating very often with remedies very imperfectly understood), but that he must, by that direct and *congenial* aid which drugs seldom give, rouse each organ to a more vigorous performance of duty, and rouse the whole

constitution from its depression, to assist by the general vital force each special organ, and then, if possible, so invigorate the psycho-dynamic health region as to place the whole being on a higher plane of life.

There are certain general principles to be continually borne in mind. Health, happiness, and efficiency depend on the predominance of the upper half of the back and the upper half of the occiput — over the abdominal region of the body, and the anterior inferior region of the brain covered by the face.*

Upward and backward passes over the front of the body, but especially over the abdomen, are of great benefit in nine tenths of the cases of disease. When you find one fatigued, debilitated, feverish, melancholic, or depressed in any way, the brisk upward passes over the abdomen, either upon the clothes or upon the uncovered person, are always felt as restorative, refreshing, and strengthening. The abdomen is the castle and battle-ground of disease, where life is busily engaged in conquering, to assimilate the dead matter introduced, and where the portal vessels gather the most degenerate and devitalized blood of the whole body. There are the abundant nerves, the acute sensibilities, and the atonic relaxation which invite disease. There is the continual gathering of all the foul, dead, and morbid matter of the body, prior to its expulsion; there is the open thoroughfare of dead matter, coming in to be vitalized, and taxing the resources of vitality to lift it to a higher condition. If it is not at once controlled and partially dissolved by the healthy energy of the secretions, it becomes an immediate oppression and cause of debility, disease, or suffering. The abdominal organs are therefore a continual tax upon the constitution, to assist their battle with dead and decaying matter, and its accumulation either as undigested food or as unexpelled decomposition, lowers the general vitality, which gains its maximum vigor only after the expulsion of the waste and the digestion of the food supply. There is a sensible increase of vigor after every act of digestion and every act of expulsion. The vigor of these acts depends upon the spinal column, extended along which we find the spinal cord and sympathetic ganglia.

*This does not imply that the abdominal region is the seat of injurious influences, or that it is not absolutely necessary to human life and harmonious development, but simply that the abdominal region has not the vitalizing, elevating, and protective power which belongs to the chest, and that if it were the *ruling* element of the constitution there would not be sufficient vital force to animate and perfect the crude material which it introduces but does not fully vitalize, and to resist the malign impressions to which the nervous system of the abdomen is continually liable. The vitality which enters by the brain and chest elevates the constitution from abdominal helplessness, and as soon as the thorax ceases to act in respiration the fatal decline of life begins. A low grade of life, such as that of the oyster, may exist when the digestive apparatus is the chief element of the constitution and the respiration is reduced to a minimum.

Morbid and excessive concentration of excitement to the abdomen is lowering, and its dispersion is invigorating — hence, in addition to the upward and backward passes, dispersive passes from the lower region of the abdomen down the thighs are highly beneficial, transferring the excitement from the hypogastric region of depression to that of physical force — the thighs and legs — as the upward passes carry it to the shoulders.

[The doctrine that the relaxing influences belong to the abdominal region, and the energetic influences to other portions of the constitution, is illustrated by many familiar facts, beside the terribly debilitating and prostrating effects of abdominal diseases. Whenever we make a vigorous exertion, calling forth our maximum energy, the abdomen is powerfully compressed by the abdominal muscles and diaphragm, the descent of the latter being sustained or aided by the closure of the larynx retaining the air in the chest, the compression of which assists the downward pressure. Without this compression of the trunk, driving out the abdominal blood into the muscular system, brain, and spine, our maximum energy cannot be attained. On the other hand, the congestion of the blood in the abdominal region from any cause is extremely depressing and dangerous, as we see in congestive chills and the collapse of cholera.]

In a great many cases a single treatment in this way by an efficient healer will break up a commencing fever, or arrest the progress of one which is more advanced. It will also relieve cases of diarrhœa and cholera morbus, menstrual disorders, hysteria, and melancholy.

Following this operation, the hands should be placed on the region of Health on the shoulder blades, the perfect vitality of which has already been explained, and a gentle or vigorous percussion applied over the whole upper part of the back, from the neck ten or twelve inches down.

A gentle stimulant or mild capsicum plaster, six or eight by ten or twelve inches, according to the size of the person, may be placed across the shoulders, to maintain the impression thus produced, and left upon the patient for a few hours.

If any particular remedy is plainly and positively indicated, it may be applied upon the skin as an embrocation under the plaster, in the form of a tincture or strong decoction, and its constitutional effects produced without introducing it in the stomach. The most sensitive locality for the external application of medicines is on the median line between the sternum (breast bone) and umbilicus.

As the physician should combat not only the prostration of the vital powers generally, but the special debility, disorder, and disease of each organ, he will go to the basis of the vital forces in the spinal

column to reinforce the dilapidated energies. The vital forces and positive elements are in the posterior half of the brain and the body — the sensitive and negative in the anterior. This is the general plan of the animal kingdom. In the torpedo, for example, the spinal side of the body is positive and the abdominal surface negative. The current is from the spinal toward the abdominal surface.

The commanding importance of the spinal region has not escaped the observation of the most enlightened practitioners of electro-therapeutics. Dr. Beard says: "In the employment of general faradization particular attention should be given to the spine, even at the expense of neglecting other portions of the body;" and he recognizes the upper dorsal region as the most important portion of the spine.

M. Gondret in 1850 (in "Encyclographie Medicale") published his method of treating intermittent fever, which he stated had in his hands never failed to cure. He applied eight or ten cupping glasses on each side of the spinal column from the neck downwards, letting them remain about thirty or forty minutes. This was simply dry cupping, as no scarification was used. The application was made at the beginning of the cold stage, or preferably a quarter of an hour before. This he stated not only prevented the attack but overcame the subsequent fever. One application of the cups, he stated, was sufficient, except in long-standing cases, which might require three or four. This method, he stated, had never failed in his practice of twenty-seven years.

He stated that when there was headache, giddiness, heat and heaviness of the head, "I apply cups to the *back of the neck*, and sometimes take away an ounce or an ounce and a half of blood, which immediately relieves; if there is cough, difficulty of breathing, palpitation, etc., I apply them *between the shoulders* and draw two or three ounces of blood, and so on. By following this plan I always find the symptoms disappear in a short time."

M. Gondret certainly found the correct locations, and his practice was rational, but in the medical profession the most valuable ideas which do not emanate from a college or a high authority easily fall into oblivion. Authority is more influential than truth.

As another illustration of the same principle, rheumatic pains in the arms may often be controlled by cupping at the origin of the brachial plexus on the back of the neck, and pain of the jaws and teeth in dental operations may be controlled by the application of ether in front of the ear at the origin of the trifacial nerve. Facial neuralgias may also be treated on the same principle. They were cured by my colleague Prof. T. V. Morrow by counter-irritation near

the origin of the trifacial nerve (in front of the ear) with the eclectic irritating plaster.

The seats of the various energies which may be roused through the spinal column are arranged in a very simple and intelligible way along the spine. In all animals the different portions of the spinal cord, instead of being a simple uniform channel from the brain to the muscles, vary in size according to the development of spinal nerves for the different parts of the body.

That the spinal cord is not a mere channel to and from the brain, but has special endowments in every part, is shown by its varying size in different portions. Volkmann, by weighing four portions of the spinal cord of the horse, found them to differ greatly. That below the second pair of nerves weighed 219, that below the eighth 293, that below the nineteenth, 163, and that below the thirtieth 281 grains. In all animals the cord is larger where important nerves are given off.

Volkmann has shown also that each pair of the lymphatic hearts of frogs depends for nervous influence upon a small section of the cord, destruction of which arrests its movements, but destruction of no other part has this effect, if the special portion is not disturbed.

The interesting experiments of Dr. F. Harless on frogs, corroborated by those of Engelhardt and Potelli, show that in them the upper part of the cord governs the flexor and the lower the extensor muscles. For the upper limbs the division between the flexor and extensor portions was at the fourth vertebra; for the lower, the division was at the fifth. There is something analogous to this in man; for the emotions and impulses connected with the upper part of the spine and the corresponding upper region of the brain tend to acts of a more gentle character, in which flexion is employed, while acts of violence, which employ the extensors, proceed from the inferior region of the brain and the corresponding inferior region of the spine. As the flexor functions are located higher, they survive extension in paralysis and in death.

The dorsal summit of the spinal column is the region that invigorates the brain, and may therefore be called CEPHALIC. The stimulation of that region gives strength of will, dignity of character, self-reliance, and all that belongs to conscious strength of character.

The three upper dorsal and four lower cervical vertebræ are the location of the channels of the power which invigorates the brain and the entire character. The elevation of this part in a proud, manly erect attitude expresses the strength of the character, and its depression in a drooping attitude characterizes humility, timidity, feebleness, and disease. There may, however, be a large amount of the coarser energies from the lower part of the spine when the nobler energies of this region are defective, as we see in misers and men of bad, coarse character, whose shoulders droop while the back projects. It is from this region that the nerves proceed which supply the arms by which man exercises his intelligent vigor and enforces his authority. The arms are physiologically associated with the occipital organs near the median line, in which are situated the commanding and ambitious faculties. The capacity of the cephalic region of the body to sustain the brain power makes it important, not only to success in life, but in overcoming the irresolute feebleness of ill-health and prostration of severe diseases. Hence, when the patient is failing in for-

titude, stability, self-control, power of attention and self-reliance, this is the region to be roused, while we should disperse from the hypochondriac regions — the margin of the ribs, in which the enfeebling, depressing elements are seated.

I do not mean by these remarks that the power of the spine overrules that of the brain, but that it is a co-operative instrument, as the entire body, by the laws of Sarcognomy, responds to the entire brain in sympathetic co-operation. Each portion of the body co-operates with and strengthens the portion of the brain with which it is in sympathy. As the eye is the necessary instrument of the perceptive organs, and the muscles the necessary instrument of combativeness, it is obvious that the loss or decay of these instruments would diminish the perceptive and the combative powers.

The upper region of the spinal cord, which I designate as CEPHALIC, is by far the most important, as it is also the largest portion. Even the great muscular power of the lower limbs, sustained by an enlargement of the cord at the beginning of the lumbar region, does not require so large a development. The posterior or sensory roots of the spinal nerves show a more marked predominance over the anterior or motor in the cephalic region, corresponding to the refined sensibility of the upper part of the body. These sensitive fibres are softer and finer than those of the anterior motor nerves.

The cephalic region embraces the four lower cervical and three superior dorsal nerves, which hold under their jurisdiction the arms, shoulders, and upper part of the chest. By these muscles are executed all the movements of the arms, hands, and shoulders, while they erect the head as well as the shoulders, and produce all the commanding dignity of human attitudes. The region of the body to which the nerves of the cephalic region are distributed may be called the cephalic region or zone — the region which sympathizes with the brain and sustains its functions. This I state, not from anatomical inferences or theories, but from experimental facts — the production of similar conditions by the brain and by the body.

The largest nervous emission from the cephalic region is the *brachial plexus*, devoted to the arms, formed from the fifth, sixth, seventh and eighth cervical nerves, and first dorsal. The anterior branches of these nerves form the brachial plexus, and the posterior go to the muscles and the integuments of the lower part of the neck, corresponding externally with the cephalic region.

In addition to the nerves of the arm, the brachial plexus and its spinal roots give off nerves for the upper thoracic region — the anterior and posterior thoracic, the supra-scapular, sub-scapular, and superior muscular, and supply the major and minor pectoralis at the lateral front of the chest, the serratus magnus on its lateral surface, and in the neck and shoulder supply the longus colli, complexus, spinatis cervicis, multifidus spinæ, scaleni, rhomboidei, supra and infra spinatus, shoulder

joint, terres major, subscapularis, subclavius, levator anguli scapulæ — and latissimus dorsi at the back of the chest. There are also two large nerves from the fourth cervical (acromialis and clavicularis), which pass to the surface of the front of the chest, between the sternum and acromion process. From the lower part of the cephalic region — the first, second, and third dorsal nerves — proceed the *intercosto-humeral* nerves, which supply the posterior inner part of the arm, the lower part of the scapula, and the surface in the axilla. This location corresponds closely in its character with the cephalic region at the spine. The upper dorsal nerves in their anterior or intercostal distribution correspond with the course of the ribs, and therefore relate to the upper part of the chest — the third and fourth supplying the mammary gland. Hence the region above the mammary gland may be properly included in the cephalic zone, with which it is also identified by its functional sympathies with the highest elements of humanity, connected with the upper portion of the brain, the region of Love, Philanthropy, Hope, Religion, and Integrity. The connection of the upper dorsal region with the mammæ, the seat of Love, illustrates the correlation of Love and Health in the brain, which correspond to the mammæ and upper dorsal region.

The fact that the cephalic region of the trunk is also a brachial region, being the origin of the brachial plexus, indicates an important relation of the arms to the brain, and hence *the importance of exercises of the arms and shoulders to promote the energy of the brain.*

This intimate association is illustrated by anatomy, as the arms and the head receive their common supply of red blood through the same arteries, the subsclavian, and return it likewise through the subclavian veins. Hence the increase of the subclavian flow brings a simultaneous increase of energy to the arms and the brain. We may suppose that any organs dependent on a common vascular trunk for their supply may be associated in action. The arms are the agent by which our intelligent plans and purposes are executed. They are the chief instruments of the brain, all skill being manifested by the fingers and the play of our emotions and energies being expressed by gesticulation of the arms.

There is another striking illustration of this correlation. The arms (including hands, of course) attain their highest development in man. So does the occipital brachial region, in which man excels very far all animals. This occipital region gives the ambitious impulse, the spirit of command and dignity of character which are so pre-eminent in man, and which are sustained by his superior brain and his efficient arms, which make arts and manufactures possible. If his hands were reduced to paws or hoofs, his pre-eminence would be lost, his civilization undeveloped, and, his ambition and self-respect having no adequate foundation, the organs would fail, and his occiput be reduced to the animal type.

Another very important relation of the cephalic region, illustrating its commanding position, is found in the *phrenic* nerve, commonly regarded merely as the nerve of the diaphragm, but really one of the most important and extensively related nerves, comparable to the pneumogastric and sympathetic, and similar to the sympathetic in some of its functions, but going more freely to the diaphragm than the heart.

The phrenic originates from the third, fourth, and fifth cervical, also communicating with the vertebral ganglion, and thus associates the cephalic region with its very extensive and important functions, as the vertebral is the commanding centre of the vital energy of the occipital brain and spine. Through its branches to the lower vena cava, pericardium, and *right auricle*, it has an important influence on the heart, assisting its action. This is probably the reason that the right heart, being thus more intimately associated with the brain than the left heart, is the last to die, as shown in experiments on animals.

Through its distribution to the diaphragm it becomes an important vital nerve, and connects the cephalic region, from which it comes, with the act of inspiration as well as with the action of the heart, with which it is connected by the direct branches just mentioned, and by its association with the vertebral ganglion, which is one of the sources of power to the heart. This arrangement illustrates the character of the cephalic zone as the source of life, in which it corresponds with the brain, which is the primal source.

As the sensitive nerve of the pleura costalis, the sensibility of which is very acute in pleurisy, it represents a region that sympathizes with the upper cerebral surface and connects also with pulmonic regions of the spine.

Finally, by its distribution to the peritoneum, liver, small intestines, and supra-renal capsules, it brings these regions into a close relation with the brain and lungs, such as we see illustrated in the coughs and convulsions produced by the intestinal irritation of worms.

This latter distribution is an important fact in Sarcognomy, as without it there would be no anatomical explanation of the functions I have found at the abdominal surface (the regions of Respiration and emotional expression for the entire brain). But even this anatomical illustration is hardly an adequate explanation of my discovery, which requires some additional knowledge for its full comprehension.

The cephalic region of the spine is closely connected with the vertebral ganglia (lying at the junction of the cervical and dorsal vertebræ, or between the last cervical vertebra and the first rib). They are under the immediate control of the cephalic region, as all the ganglia communicate with and are controlled by the adjacent regions of the cord. Branches may be traced from the seventh and eighth cervical nerves to this ganglion. The vertebral ganglia are the governors of the entire circulation of the posterior half of the brain and its downward extension, the spinal cord. They lie on the vertebral arteries which give the supply of the posterior part of the brain and the spinal cord, and send a plexus along the course of these arteries, which accompanies their ramifications (after forming the basilar

artery) with minute branches, which finally connect with the analogous branches coming from the carotid plexus along the carotid arteries and branches for the anterior half of the brain.

When the operator's hand is placed on the cephalic region, it covers the subclavian artery (for the brain and the arm) adjacent to the last cervical vertebra, the vertebral arteries which supply the brain and spine, and the vertebral ganglia which not only control the circulation of the energetic portion of the nervous system, but contribute to sustain the action of the heart.

The superior regions of the brain sympathize with the superior region of the chest, as is shown by Pathology (and as I have often felt in my own person), in accordance with which fact the vertebral ganglia (belonging to the cephalic region) send some branches down to unite in the pulmonary plexus (which is supplied from the third and fourth ganglia in the dorsal region) with the pneumogastric, the sensitive nerves of the lungs and heart.

They also co-operate with nerves from the cephalic region, viz., the seventh and eighth cervical and first dorsal, in forming the axillary or brachial plexus, which controls the arms and shoulders. Moreover, they send down one of the principal nerves of the heart. Probably this nervous connection may explain the pain felt in the left arm as far down as the elbow in cases of cardiac disease.

From the first three dorsal vertebræ proceed the anterior spinal nerves, called intercosto-humeral, which supply the inner and posterior surfaces of the arm, the axillary region, and a portion of the upper frontal surface of the chest. These surfaces, according to Sarcognomy, correspond with the regions of dignity, cheerfulness, authority and affection in the brain, and a portion of the emotional and intellectual region sympathizes with the frontal distribution of the first dorsal: the first three nerves are therefore strictly cephalic in their distribution.

Thus we see *the cephalic region is a great centre of power*, sustaining through its subordinate ganglionic nerves the posterior cerebral lobes, cerebellum, and spinal cord, while it controls the upper limbs, sustains the action of the heart, and contributes to the organic life of the summit of the lungs, which sympathizes with the upper part of the brain. At the same time the posterior nerves from the cephalic region of the cord supply the integuments of the upper part of the back, which Sarcognomy shows to sympathize with the upper occipital region of the brain. In short, we have here the vital knot, the combination of the executive power of the arms as well as the cerebro-spinal and cardiac power, with the pulmonic region, which is at once the sympathetic support of the brain and the inlet of life conditions

to the body — spirit life, blood life, action, and inspiration being here inextricably combined. Hence, in exciting this region in the impressible, they feel a great sense of additional strength and manhood, or force of character, for it commands the entire forces of the body. Any one who wishes to realize its influence, if not impressible by the hand, may realize it by placing upon it a gently stimulating plaster, and if the plaster should also extend down as far as the sixth dorsal vertebra, the stimulation of the lungs and heart will greatly increase the effect and enhance the capacities for social or oratorical exertion.

In looking over the experience of electric therapeutists, I cannot but wonder that they should have so generally failed to recognize the local influences revealed by Sarcognomy, when they are clearly indicated by the history of diseases.

The cephalic region of the cord, however, has not *entirely* escaped observation. Dr. Rockwell, in "Lectures on Electricity," says: "The *back part of the head and upper portion of the spine* (cilio-spinal centre) will usually bear powerful applications; and it is an interesting and important fact that applications to this centre will produce far *greater tonic effects* than when the pole is applied to any other one portion of the body." No doubt much of his success in electric treatment was due to his discovery of this fact.* Dr. Rockwell is a stronger advocate of faradization than the majority, and superficial faradic currents might be used with great benefit on the two regions he mentions.

That the cephalic region sustains the power of the brain was illustrated in a case reported in the London "Lancet," by Joseph Ewart. In this case a married woman of twenty-nine, after undergoing an amputation of one of the metacarpal bones of the hand, under chloroform, fell into a state of insensibility, with contracted pupils and very feeble, laboring respiration. After efforts at her resuscitation for two hours and a half there was no recuperation, but diminishing respiration and increasing coldness. In this dangerous condition galvanism was applied for two or three minutes over the chest and "top of the spine," and through the brachial plexus. This was exactly the proper application to rouse the brain, and it produced immediate recovery.

*An additional illustration of the character of the cephalic region of the body may be found in the muscles which it contains. The trapezius, rhomboideus major and minor, upper serratus, splenius colli, semi-spinales colli and dorsi, spinalis cervicis, upper interspinales and multifidus spinæ, all contribute to maintain the firm, erect attitude of head and shoulders which is pathognomic of strong character and sustained energy. These are adjacent to the spinal cephalic region. The muscles further off, controlled from the cephalic spine, in the shoulders and arms, with the serratus magnus and pectoralis, on the chest, are the muscles of intelligent action and expression, by which mainly the conceptions and purposes of the brain are carried out; while the inspiration that vitalizes the brain is obtained through the fourth and fifth cervical and the upper intercostal nerves and muscles, aided by the upper serratus, serratus magnus, and upper levatores costarum.

She rose from the bed, sighed frequently and profoundly, opened her eyes, and was able to answer questions.

A knowledge of the character of the cephalic region may be of great value in diseases which, like typhus, affect the brain. Dr. Gerhard, of Philadelphia, discovered the value of the cephalic region in the treatment of typhus fever.

Scarified or dry cups, applied to the nuchæ or along the spine between the shoulders, have been found of great efficacy in removing or diminishing the suffusion of the eyes, the injection of the face, the headache, the delirium, and other symptoms. They constitute in nearly all the cases a part of the treatment pursued by Dr. Gerhard at Philadelphia in 1836. Speaking generally of dry cups, he says: "Applied in considerable numbers, and left upon the nape of the neck and between the shoulders for twenty minutes or half an hour, they always seemed to me more powerful in nervous functional derangement, not attended with inflammation, than scarified cups. I have used them largely in the treatment of the apoplectic symptoms of malignant intermittent with the best effects, and resort to them with confidence as one of *the most powerful means* of controlling discordant nervous action." (Bartlett on *Typhoid and Typhus.*)

Dr. Beard, by his experience in electrical treatment, discovered the great importance and controlling power of the upper dorsal region, of which he says (page 391): "There is no other single place on the surface of the body where the electrical influence can be communicated to so many important nerves as at the cilio-spinal centre." "This application is a very important factor in general faradization, and will achieve decided tonic effects on the system even when no other portion of the body is touched by the current." The anatomical reasons which he gives, however, are entirely inadequate to explain its importance.

The stimulation of organs by nervauric influence is not limited to any exact lines, but is always diffusive. Hence I shall not assign any exact boundaries to the localities to be acted on, but allow them to overlap. I speak of the second and third dorsal vertebræ in the cephalic group, although their adjacent ganglia are tributary to the upper portion of the lungs. The second and third dorsal spinal nerves supply the posterior aspect of the arm, and inner aspect of arm and fore-arm, which associates them practically with the brachial plexus that springs from the cephalic region. The region these two nerves supply corresponds with the posterior lobes of the brain along the median line and turning in between the hemispheres.

There is another curious fact, illustrating the cephalic influence of the upper part of the spinal cord, viz., that the second dorsal nerve

originates the expansion of the pupil of the eye. Yet such is the diffusive tendency of impressions on the nervous system that this influence may be excited anywhere from the first cervical to the sixth dorsal nerve; hence this space has been called the *cilio-spinal region*. But exact experiment has shown that the second dorsal nerve is the sole seat of this spinal power. It is, however, exercised or transmitted through the sympathetic ganglia and nerves of the neck, the section of which deprives the pupil of the power of dilation by cutting off communication with the cord at the second dorsal nerve.

Why there should be such a control of the iris at the second dorsal nerve is a mystery, but when we find it identified with the brachial region, supplying the posterior surface of the arm, we recollect that the posterior surface of the arm corresponds in Sarcognomy with the occipital region on the median line, to which anatomists give the name of the *cuneus*, and in this *cuneus* they find so close an association with the optic nerve in its diseases as to induce them to infer that it is the seat of vision. Moreover, the same claim is made for the *angular gyrus*, in consequence of the experiments of Ferrier on pigeons, in which its injury produces blindness. There is a good pathognomic reason for both locations, for they are coinciding or co-operative organs; the cuneus of one hemisphere co-operates with the *angular gyrus* of the other. That both are associated with vision and give power to the eye agrees with my experiments, though I do not believe that vision is independent of the perceptive intellectual organs. Another reason in favor of the *cuneus*, in connection with the cilio-spinal region, is that its influence is expansive.

Onimus and Legros have ascertained by their electric investigations the value of the cephalic and upper dorsal region as to its controlling influence in the head, not knowing the neurological relations of the parts, but guided by the cilio-spinal phenomena. "In peripheric lesions" (they say) "it is advantageous to electrize only the nervous centres." "Hence, to *act on the circulation of the head* and especially of the eyes it is preferable to electrize the cilio-spinal centre, rather than to place the electrodes directly on the face or near the eyes," which is very true, as applications on the face would be rather injurious to the cerebral circulation.

The upper half of the dorsal region of the spinal column may be regarded as its thoracic portion and the lower half as abdominal. Hence, in treating affections of the lungs and heart, we act upon the upper half, reaching the nerves emitted at the first six vertebræ. If the first three are accessary to cephalic action, they are none the less pulmonic, as the upper pulmonic region is directly tributary to the brain by sympathy and correspondence.

The application of the hand on the upper dorsal region, between the shoulder blades, produces a wholesome, invigorating effect on the lungs, and a similar effect is produced by any other stimulating application. Anatomy illustrates the relation of this region to the lungs through the blood-vessels. The aorta from the third to the sixth dorsal vertebræ sends off the bronchial arteries, which are the arteries of the bronchial region and the lungs. The posterior pulmonary plexus and the root of the lungs through which they are supplied with air are on the level of the three upper dorsal vertebræ. To speak exactly, the bifurcation of the trachea is opposite the third and fourth dorsal vertebræ.

The heart, too, is invigorated from this region, and we cannot entirely isolate the cardiac and pulmonic influences. The five upper ganglia in the dorsal region send branches to the cardiac plexuses formed by the union of the pneumogastric nerves with those of the three cervical and upper dorsal ganglia. These plexuses sustain the heart.

Hence diseases in this locality affect the heart. Sometimes the symptoms of an acute affection of the heart have manifested themselves, when the irritation was seated in the dorsal region. M. Serres relates a case of meningeal inflammation and *ramollissement* of the cord, in which the heart's action and impulse were of such a nature that the disease was pronounced to be dilation with hypertrophy of the left side of the heart, which notwithstanding proved to be perfectly sound.

Below the first dorsal nerve (which goes to the arm) the next seven spinal nerves, going anteriorly, supply the muscles and integuments attached to the ribs, and thus, although they do not supply the lungs, they are associated therewith in action, giving inspiratory power to the intercostal muscles, and sensibility to the chest. The interior and exterior of the thorax are thus connected with the upper region of the cord, which may be strictly called thoracic, as it governs the thorax both internally and externally, and the posterior dorsal nerves supply the muscles and integument of the back — the upper half of them supplying the thoracic region.

As we find the maximum *excitability* (which is intermediate between power and sensibility — between impression and reaction) on the lateral surface of the head and body, we are not surprised to discover that the corporeal region of Inspiration is on the lateral surface of the thorax (see map) behind the mammæ, running down to the seventh rib and thus corresponding with the anterior distribution of the intercostal nerves and muscles, the agents of costal inspiration, and associates of the phrenic nerve in diaphragmatic inspiration.

The costal inspiration is more cephalic and spiritual in its associations with the brain; and diaphragmatic inspiration which belongs to a lower position on the head and body is associated with the basilar region and impulsive energies and passions.

According to Drs. Griffin, when the dorsal region exhibits tenderness, we find pains about the chest or in the side, weight and constriction of the chest, cough and fits of syncope, sense of sinking, loss of appetite, gastrodynia, pain in the region of the liver, and hiccough" — all of which is explained by the functions of the dorsal region.

If physicians had been accustomed to report the pathological effects of irritation of the spinal cord, we should have had a fine illustration of its functions.

Dr. Robert Little, in the "Southern Medical and Surgical Journal," described the effect of spinal irritation as follows: "Irritation of the cervical division is indicated by pains in the face, temples, and scalp, accompanied frequently by rigidity of the muscles of the jaw, when confined to the superior part. When the irritation is lower down, there is pain in the region of the clavicle, scapula, and chest, extending along the arm, giving rise to great *lassitude*, sighing, spasmodic twitchings of the muscles, etc. When the dorsal division is affected, we have, in addition to a few of the foregoing, *stricture across the chest, difficult breathing, palpitation of the heart, angina pectoris*, darting pains in the intercostal muscles, edges of the ribs and the *epigastrium*. Lower down still in the dorsal division pains in the *stomach and abdomen* are felt. In addition to these, a burning sensation in the sternum and ensiform cartilage is said to be always present in decided cases of irritation of the dorsal nerves. When the lumbar and sacral division are in a state of irritation we have pains of an acute lancinating character, soreness in the skin and muscles over the genital organs, spasmodic twitchings along the course of the crural nerves, together with an unsteady carriage in walking, the patient having no confidence in his ability to retain an erect position, and exhibiting the reeling appearance of a drunken man." He ascribes also to the superior spinal nerves "throbbing of the carotid and temporal arteries, acute pains in the head, violent palpitation and painful sensation of the heart, and a feeling of inability to expel the air from the lungs."

The influence of the various portions of the spinal cord was imperfectly illustrated by Sir B. C. Brodie in his work on diseases of the joints. His reference to the constitutional symptoms, though limited, shows several important facts, such as the following:—

In caries of the cervical vertebræ there is pain in the neck, some-

times quite severe. Pains in the arms and shoulders seem followed by paralysis. "In all cases there is pain in the *occiput and temples*, which is, however, most severe when the disease is situated in the two or three superior vertebræ." In some advanced cases, the cord being irritated by pressure, "the patient complains of increased pain in the head, followed by convulsions, stupor, dilated pupils, and other symptoms of effusion of fluid on the brain; and on examining the body after death, we find that such effusion has actually taken place, there being a collection of fluid in the ventricles or in the base of the cranium, or in both of these situations."

This is the location which my experiments prove to be associated with cerebral disorder, and on which counter-irritation has the best effect on the brain, as many physicians have realized.

"In caries of the superior dorsal vertebræ, besides the usual pain and tenderness of the affected parts, the patient complains of *pain and a sense of constriction in the chest*; and when the disease is in the inferior dorsal vertebræ there is a similar *sensation in the epigasrtium*, *pain in the abdomen generally*, and a disturbed state of the functions of the *alimentary canal*. Occasionally the urine is alkaline, or contains albumen, from which circumstance, in connection with the existence of pain in or near the region of *the kidney*, it is sometimes difficult to determine, in the first instance, whether the patient labors under caries of the spine or *disease of the kidney*."

Of course the progress of the disease downwards involves the lower part of the body.

"As the disease advances the patient in some instances complains of pains which are referred to *one groin or hip*. This circumstance not infrequently occasions an error in diagnosis on the part of even practical surgeons. Afterwards pains and a sense of constriction are felt in the *legs and thighs*. Then the muscles are found to be not properly under the dominion of the will, so that the patient occasionally loses a step or trips in walking. This is probably followed by a complete loss of voluntary power. Paralysis of *the bladder* and *incontinence* of the urine and fæces sometimes accompany paralysis of the lower limbs."

Abscesses are formed, which appear on the chest or the abdomen, sometimes occupying the space between the ribs and groin. Caries of the lumbar vertebræ produces pains in the loins, abdomen, and groin. In cases of lumbar abscess, he has always found caries of the vertebræ its cause.

Thus it is anatomically and neurologically certain that the upper half of the dorsal region is thoracic, and is the region on which to treat all thoracic affections.

The close relation of the upper dorsal region to the functions of the lungs is illustrated by their anatomy. Cruveilhier says: "The pulmonary plexuses which are completed by *filaments from the great sympathetic* are situated behind the root of each lung, or, to speak more exactly, *behind the bronchi.*" These nerves "may be traced as far as the ultimate ramifications of the air-cells." In large animals they can easily be seen entering the circular muscular fibres which surround the bronchial tubes. Hence we perceive that when the hand is placed upon the upper dorsal region, it is in close relation to the ganglionic and pneumogastric plexuses which control the lungs.

Dr. J. L. Pidduck, in the "Lancet," speaking of the treatment of hooping cough, recommended counter-irritation at the summit of the spine, and said: "Leeching the upper part of the spine and blistering between the shoulders, by arresting the violence of the cough, speedily remove the congested and inflammatory states of the brain which the hooping-cough frequently occasions."

The thoracic region has widely different characteristics in its upper and lower regions. The lower portion of the chest, brought into play by the diaphragm, is associated with vigorous, active life, and is most readily brought into play by the active exertion of the lower limbs. Its tendencies in disease are chiefly inflammatory. The upper portion of the lungs is the part used in quiet sedentary occupations, and is therefore more nearly associated with the intellectual and moral faculties. It is the chief location of consumption, a disease arising from imperfect physical development and blood-supply. The superior portion of the chest is associated with the delicate, refined sentiments which are antagonistic to animal force. The organ of Mortality or ecstatic trance, belonging to the upper surface of the brain, has its correspondence on the upper surface of the chest, above the nipple. Hence diseases in the upper portion of the lungs tend strongly to death; and this was the cause of the invariably fatal character of pulmonary consumption until within the last forty years more correct ideas of its treatment have been slowly gaining ground against dogmatic opposition. Pneumonia, belonging chiefly to the lower or more vitally energetic portion of the lungs, would never have been considered a very dangerous disease but for the absurd and injurious methods of its treatment. But pneumonia, too, becomes a very dangerous disease when it seizes the upper portion of the lungs. Prof. Boling says that pneumonia, "commencing at the apex of the lung, is in proportion to the number of cases the most frequently fatal form of the disease." He had met with about six cases of this affection; they all proved fatal — the deaths occurring from less extensive alteration than usual. Prof. Eberle used to speak of

suddenly fatal cases of relapsing pneumonia from congestion of the superior portion of the lungs, with so little disturbance that they had what he called a "morbidly natural pulse." These fatal upper-lung cases of pneumonia are accompanied by a *persistent* mucous or crepitant rhoncus, that should warn us of the danger, which is also found in fatal consumptive conditions.

Costal respiration, which develops the upper part of the chest, the seat of refined sentiments, is more characteristic of women, as diaphragmatic respiration, which develops more vital impulse, is characteristic of men. Hence, women have smaller waists, and are more willing to undergo tight lacing.

The upper part of the chest, corresponding with the upper surface of the brain, co-operates in determining the vital forces upwards or toward the head. The upper part of the chest, therefore, is the region of cephalic tendencies, and there are a great number of pathological facts that illustrate this proposition, which I may present when I undertake a full exposition of Sarcognomy.

We may say that the entire chest above the waist, being the upper portion of the body, corresponds with the upper portion of the head, above a line running back horizontally from the brow. The absolute summit or upper surface of the head corresponds to a region occupying the upper surface of the shoulders and summit of the spine and extending low enough in front to include the mammæ.

The upper surface of the brain manifests functions, according to the law of pathognomy, which are associated with the happy and benevolent upward tendencies, and the same remark is, of course, applicable to the corresponding upper surface of the chest. The mammæ are associated with the function of love in its physiological and psychic operation, and hence their development brings on the age of love and the fitness for its duties. The same loving and happy influence is associated with the upward development of the womb, and the opposite condition with its drooping and prolapsing tendency. Hence the womb and the mammæ, as well as the upper surface of the brain (the seat of loving emotions), are in close sympathy from the similarity of their tendency. The elevation of the womb in pregnancy brings on the development of the mammæ, and the love and caresses of the child have a similar influence to produce and sustain it.

Cazeaux, in his work on midwifery (p. 1064), relates the case of a woman, Angeline Chaupfaille, sixty-two years of age, who undertook to nurse her grand-daughter and occasionally presented her nipple to the child. Although it was twenty-seven years since she had borne children, this emotional influence brought on a full supply of milk, and she nursed the child a whole year till it was weaned.

A striking illustration of this sympathy is afforded by cases of sunstroke, which are supposed to be simply affections of the brain. In three fatal cases of sunstroke, which occurred in the Sixty-eighth regiment, at Madras, India, autopsies were made by Surgeon Russell, who found in all alike no material disorder in the brain, "but in all three the lungs were congested even to blackness, through their entire extent."

In a violent outbreak of typhus fever among the British troops in Spain, as reported by Surgeon Bacot, the patients came to the hospital very much depressed, sad, and melancholy; "giddiness of the head was a frequent complaint, and *deep and constant sighing was a universal symptom.*" This sighing inspiration is an effect of the upper region of the brain, especially under depressing influences — a common effect of the amiable emotions which elevate the chest and the feeling of depression which acts on the diaphragm anteriorly.

Dr. Bartlett says "the morbid alterations which are found within the cavity of the chest seem to be more constant and more important in typhus than in typhoid fever. The lungs were more or less changed from their healthy condition in all the cases reported by Dr. Gerhard. This change generally consisted in a somewhat peculiar condensation of a portion of one or both lungs. . . Of forty-three cases examined by Dr. Reid, there was more or less lesion of the lungs in all." It appears from a careful comparison that extensive engorgement and congestion of the lungs were more frequently associated with those cases in which there was increased serous effusion within the cranium, than with those where this condition did not exist. Nearly all these patients exhibited more or less prominent cerebral symptoms. Dr. John Cheyne, who made a number of dissections in Dublin, said "our expectations were never disappointed as to the state of the brain. . . The vessels of the head were turgid; there was increased vascularity of the brain, especially on its surface."

Thus it appears that the state of the cephalic circulation, whether hyperemic, irritated, or congested, is responded to by similar conditions in the lungs, and I have often personally experienced that a determination to the upper region of the brain, stimulating the amiable and intellectual faculties, is produced by the partial hyperemia of the lungs in a cold affecting their upper portion.

The power of the lungs to affect the brain is familiar to physicians. M. Grisolle, in a clinical lecture, said "delirium is one of the most frequent and most severe cerebral accidents by which pneumonia can be complicated. One third of the cases in which this complication is observed refer to habitual drunkards. When both lungs are affected delirium is more frequent. Drs. Hourman and Dechambre state that

delirium usually accompanies pneumonia in the aged pensioners of La Salpétrière. The delirium makes its appearance at the end of the first week or beginning of the second, and varies in its intensity from quiet divagations to the most violent sort of furious raving. The appearance of delirium during the progress of pneumonia increases the severity of the prognosis."

Dr. H. W. Ranking, editor of the Half-Yearly Abstract, says of the foregoing statement: "Delirium is a more common accompaniment of pneumonia than is here represented. In children it is frequently one of the first symptoms. We have seen it before crepitation was fairly established."

The history of insanity furnishes another illustration of cephalic and pulmonic sympathy. The leading cause of death among the insane, according to Dr. Thurnam's tables, is *disease of the respiratory organs;* the fatality of which excels that of epidemic, endemic, and contagious diseases, apoplexy, paralysis, and epilepsy combined. Dr. Fischel, of Prague, reported that in that city seven per cent. of the deaths of the insane were caused by gangrene of the lungs. Dr. Webster, in the third volume of Medico-Chirurgical Transactions, made a report upon the lunatics of Bethlem Hospital for six years (1798 in number), and reported the dissection of sixty-seven, in all of which morbid conditions (chiefly serous effusion) were found in the brain. Of the sixty-seven the organs of the chest were more or less diseased in sixty-two. In the abdominal viscera morbid changes were found in but thirty.

Dr. Vierordt, of Carlsruhe, in examining fifty-one cases of typhus fever, states that the lungs were never healthy. They exhibited a wrinkling and dark red color of the bronchial membrane, with ademic and hypostatic congestion, carnification, hepatization, and in two cases, gangrene.

(An interesting anatomical illustration of this blending is observable in the location and action of the serratus posticus superior, which rises from the cephalic region and runs in the cephalic and pulmonic zones, to act as an inspiratory muscle. It proceeds from the sixth, seventh, and eighth cervical, and first and second dorsal to the second third, fourth, and fifth ribs, beyond their angles, and therefore acts as inspiratory muscles for the upper part of the chest.)

That the lower part of this thoracic region holds a close relation with the heart can easily be shown by experiment with the hand. Its effect is not exciting or agitating, but strengthening to the heart, and thereby rousing and invigorating to the whole constitution, but with rather less composure and tranquillity than by the pulmonic and cephalic regions. Sedative applications to this region will diminish

the activity of the heart. A galvanic current down the dorsal region will diminish its excitability and retard its pulsation, according to Althaus ; the current he used was that of from forty to sixty cells. The heart responds to influences from all parts of the brain and all parts of the body. In my experiments on the brain I have been able to produce all varieties of the pulse.

The heart is not dependent on the thoracic region alone, for its chief ganglionic nerves come from the sympathetic ganglia in the neck, which are connected with the cervical region of the cord, and it is also influenced by the pneumogastric nerve (which serves to exercise a restraining power). Thus it seems that both cervical and upper dorsal regions sustain the heart — in other words, it is associated closely with our whole vital brain force, through the ganglia which simultaneously sustain the brain and the heart, thus making the neck pre-eminently a vital region — a region that links the cerebral with the corporeal seat of life.

A similar close association occurs in the spine, in which the cephalic and thoracic regions are adjacent — the latter combining the pulmonic and cardiac influences in close association. The five or six upper dorsal ganglia, forming a sort of plexus, supply filaments which run to the aorta and join the great mass of ganglionic nerves that sustain the heart, the second, third, and fourth ganglia supplying filaments to the posterior pulmonary plexus. The thoracic and abdominal regions divide the spine between them nearly equally, the lower ganglia being abdominal.

The ganglia and their nerves are the sources of the power that sustains the heart, and they have close associations with the cord from the base of the cranium to the middle of the dorsal region. They are also the sustaining power of the pulmonic region, although the pneumogastric is the chief source of the pulmonary plexuses, which also receive branches from the vertebral ganglion.

But whatever the anatomical arrangement, the fact that the hand applied about the sixth dorsal vertebra energizes the heart is sufficient for therapeutic purposes. Dr. Steiner, of Vienna, has in several cases succeeded in resuscitating animals whose hearts had ceased to beat, by applying the positive pole to a needle at the heart, and the negative to the seventh intercostal space. This was in accordance with Sarcognomy.

The lower dorsal region, which by its spinal nerves gives rigidity to the trunk, and by its ganglionic nerves sustains the chylopoietic organs, receives the name of Business Energy in our chart, as the expression of its effect on character. Its impairment greatly diminishes the force of character. "In a case described by Dr. and Mr. Griffin,

sudden insensibility was always induced by even slight pressure on the seventh or eighth dorsal vertebra. In another case a sense of faintness was engendered in the same way: "On examining the spinal cord, although there did not appear to be any tenderness, the sensation of pain was excessively disagreeable to him throughout its whole course. When the finger rested on one of the dorsal vertebræ he grew pale and terrified, and would have fainted had the pressure been continued. He felt no pain, but a sudden indescribable sensation or thrill through every nerve in his frame, which was inconceivably horrid." (Murrell on Massage.)

At the upper margin of the cephalic region the fifth cervical nerve sends off a branch to unite with the fourth in forming the phrenic, the great inspiratory nerve of the diaphragm (and auxiliary nerve of the heart and abdominal viscera), which is thus brought into connection with the brain, associating the action of the brain with physical as well as spiritual inspiration — the association being completed by nerves from the vertebral ganglion to the phrenic, and branches from the seventh cervical, which go to the vertebral ganglion and also (according to Bell) generally supply filaments in company with the sixth to form the phrenic. Thus we perceive how closely the functional life of the brain is associated with the transmission of both life and oxygen to the body. Let us look closely again at the distribution and relations of the phrenic nerve.

In the interior of the chest, the phrenic nerve not only supplies the pleura costalis (with some help from the pneumogastric in the internal lamina), but supplies the mediastinum or most interior region which sympathizes with the interior and more spiritual region of the brain, near the falx, between the hemispheres, the activity of which stimulates inspiratory action. Our highest faculties invariably stimulate inspiration in the upper portion of the chest. Thus the most superior part of the cephalic region of the spine seems to associate with inspiration and with the superior and interior regions of the brain, while its most inferior portion (according to the general laws of the nervous system) has an inferior function, as it sends off the first dorsal and last cervical nerves, by which the muscles and integuments of the hand are supplied. It is a beautiful illustration of the wise and ingenious plan of the human constitution that the cephalic power in the cord which is in relation to the high and interior regions of the brain — the channel of this higher influx of life, is also in relation with the inspiration which gives an influx of vital conditions to the body, making our compound life a possibility.

The phrenic nerve also participates in the cardiac power. Opposite the third rib, it sends branches to the pericardium. It also sup-

plies the right auricle of the heart and inferior vena cava; and experiments on dogs and rabbits show that irritation of the phrenic puts the right auricle into contractile movement.

Thus we see how closely the brain power and cephalic region of the cord are associated with both circulation and respiration, and, in fact, with all the viscera, for the phrenic and pneumogastric nerves, the former from the middle cervical region, and the latter from the medulla oblongata in the cranium, convey to the brain the sensations of the abdominal as well as thoracic organs, and of their serous membranes, which are supplied by the phrenic. Thus we perceive a direct anatomical channel for the sympathies which we know to exist.

The brain belongs not to the locomotive or active, but to the visceral system, and it sympathizes with all the thoracic and abdominal viscera. Upon the lungs it depends for the vitalizing influence of red blood. Upon the abdominal organs it depends for the existence of the red blood, since they supply, through the thoracic duct, the digested material of the blood, and by their excretions they maintain its purity. Upon the kidneys it depends for the removal of narcotic and disturbing elements.

The intercostal spinal nerves, which are from the dorsal tract, are combined with the ganglionic filaments in their distribution to the walls of the chest, and also to the diaphragm. (The latter distribution is not usually mentioned in text-books of anatomy, and their description of the phrenic nerve is also defective.) Thus although the upper dorsal is the special pulmonic region, there is a respiratory influence through the whole dorsal tract, operating above through the intercostal or rib-lifting muscles, and below through the diaphragm and abdominal muscles, which latter are supplied from the lower dorsal region and constitute the apparatus of expiration. The pulmonic, cardiac, cephalic and abdominal influences of the dorsal region are so important as to make it a dangerous location for disease. The "Cyclopedia of Practical Medicine" says: "It has been observed that the fatal termination is much more rapid when the dorsal region is the seat of disease."

Let us then understand that while the upper dorsal region is the pulmonic and cardiac tract, the entire dorsal region is a respiratory tract, acting above by the ribs, and below by the abdominal muscles and diaphragm. And although the lungs and heart should be treated directly on the upper dorsal region, a cough, which involves the irritation of the expiratory abdominal muscles, has its immediate seat in the lower dorsal region, which controls the expiratory coughing muscles, and they depend much upon the irritability of that part of the cord. Hence, an embrocation or manipulation designed for the

relief of a cough may be very properly applied on the lower dorsal region, for injuries or irritations of that region may produce a spinal irritability shown by coughing. In a case of fracture of the eleventh dorsal vertebra, and softening of that portion of the cord (reported by Brodie) a cough would be brought on by any slight change of position.

It is quite interesting to find that the physiology of the dorsal region of the cord has been well illustrated in the electric experiments of Onimus and Legros. In their forty-seventh experiment, the spinal cord of a dog was exposed at the third and fourth dorsal vertebræ, and divided. In the superior part of the divided cord an upper current increased the blood pressure as it stimulated the portion of the cord connected with the cervical ganglia, and the respiration became very deep.

On the lower part of the divided cord a current from the cut end downward raised the pressure higher than the current through the upper part. A faradic current through this lower part produced at once a rapid elevation of the blood pressure and a considerable fall as the excitability was exhausted, when the action of the heart suddenly ceased. This appears to be a fair demonstration of the connection of the lungs with the region above the fourth dorsal vertebræ and of the heart with the region just below.

In a case of dislocation between the sixth and seventh vertebræ reported by M. Carassus in the "Gazette Medicale," it is stated that the pulse was feeble and frequent. The cord in this case was compressed by the sixth vertebra, and its posterior part at the junction was softened. There was complete paralysis below the injury. The mental faculties were clear; death ensued in twenty-four hours.

Injuries at the lower cervical vertebræ, below the sixth cervical, destroy all power either of inspiration or expiration, except by the diaphragm, controlled by the phrenic nerve, and by such assistance as may be given by the trapezius, serratus magnus anticus, and sterno-cleido-mastoid, in lifting the ribs — an assistance which is not very important and would not sustain life long.

The DIAPHRAGM is not entirely disconnected from the spinal system, as it may be excited from the sixth, seventh, and eighth intercostal spaces, by the hand and by electric currents. At the sixth, seventh, and eighth vertebræ, electric or nervauric stimulation gives vigor to its action, but not the restless excitement which is produced at the lateral surface of the trunk. Its connection with the spine is through branches of the intercostal nerves, as described by Luschka, and indirectly through the ganglia and splanchnic nerves and the solar plexus. The dorsal ganglia are the vasomotor control of the

intercostal arteries, which anastomose with the phrenic arteries, and they have direct communication with the phrenic nerve, through the great splanchnic and the *ganglion diaphragmaticum*, as well as a controlling influence on the diaphragm through the great splanchnic, solar plexus and *phrenic* plexus, the immediate agent of its organic life. The diaphragm, therefore, has a close relation to the spinal and ganglionic regions between the sixth and tenth vertebræ, and we may therefore recognize a *phrenic zone*, extending as low as the solar plexus.

The lower dorsal region has some other relations to the diaphragm, as the latter co-operates with the expiratory abdominal muscles, when it is necessary to compress the abdominal viscera, but not the lungs, as in vomiting or defecation, or if we wish to speak while engaged in laborious efforts. The great solar plexus, connected with the lower dorsal region, originates superiorly the phrenic plexus which goes to the diaphragm and phrenic artery, and communicates with the phrenic nerve.

As the lower dorsal region contains the ganglia which emit the splanchnic nerves that pass down through the diaphragm and govern all the abdominal viscera, we perceive how abdominal irritations in any of the organs may disturb the lower dorsal region and become the cause of a cough or its aggravation, as is seen in a liver cough or stomach cough. Most generally, however, coughs begin in an irritation of the lungs, which is conveyed by their sensitive nerve, the pneumogastric, to the medulla oblongata within the cranium, and if the irritation be sufficient, it is propagated downwards to the lower dorsal region, and produces the convulsive expiration which is called a cough. But before reaching that region it starts the phrenic nerve in the middle of the cervical region, and produces by it an act of inspiration by the diaphragm, and then in the upper dorsal region it starts the intercostal muscles, lifting the ribs, and as the chest expands, the irritation reaches the lower dorsal region and the cough or sneeze explodes by means of the abdominal muscles.

Quieting anodynes, either by inhalation, by swallowing medicine, or by manipulation, diminish the irritability of the pneumogastric and the spine, and thus relieve the cough. As secretion generally diminishes irritability and soothes the surfaces, expectorant remedies are in that way beneficial.

The diaphragm, lying between the thoracic and abdominal cavities, must be in sympathy with the middle dorsal region. It is also in sympathy with the lumbar region, for the exercise of the latter in violent locomotion compels deep respiration. Respiration will therefore be invigorated by faradic currents through the length of the spine. It may also be excited into greater activity by faradic currents from side

to side at the lower margin of the ribs, while the same currents higher on the ribs will produce a more pleasant costal respiration. The lower level of the ribs produces the respiration of excitement and irritation. Currents through the phrenic zone or level of the diaphragm stimulate respiration, but not in the most satisfactory or effective manner.

The most effective way of forcing deep respiration — the one most to be relied on in cases of drowning, is by using the Sarcognomic organ of Respiration on the abdomen, placing an electrode about two inches below the umbilicus; this will produce deep respiration by the diaphragm. If the negative pole on the hypogastric region produces too much local disturbance of the muscles, the positive may be substituted, or the current may be sent through the hand as an electrode. One pole should be on the hypogastric region and the other on the lower cervical or junction of cervical and dorsal. The current in this case will correspond with the course of the phrenic nerve, and this is better than trying to reach the phrenic nerve at the side of the neck, or to stimulate through the phrenic zone.*

As the brachial region or cervico-dorsal junction is the commanding centre from which the respiratory impulse is sent, and gives it more force than any other location, the same principle is applicable to other functions, and the combination of this region of will power with any other seat of local functions will enhance the result, just as an energetic determination invigorates every act. A current from the cervico-dorsal centre enlists the full power of the spinal cord, and thus develops a maximum energy. It is true that a current from powerful central organs, if continued, will exhaust them and make it necessary to reinforce by a centripetal, hence for efficient action an alternating current which stimulates at both ends is best. The faradic is an alternating current, but its poles are not exactly equivalent, as they have in some degree a positive and negative character or influence. The alternating current of commutation, with the primary or magneto-galvanic current, is the most appropriate for vigorous stimulation. This I call the *reciprocal* current. Its application in cases of suspended animation, from the cervico-dorsal region to the region of vital force on the thigh, is very effective.

The abdominal region on which I have located the respiratory impulse is the active agent in diaphragmatic respiration. Every inspiration, by descent of the diaphragm, throws out the Respiratory tract, and every expiration is performed by means of the abdominal muscles and an inward movement of the Respiratory region.

* I have sometimes misled my pupils by a little absence of mind, diverting their attention locally and forgetting to impress the importance of the cervico-dorsal region, especially in reference to respiration.

That the inspiratory tract should be exterior to the expiratory corresponds to the fact that in diaphragmatic or abdominal respiration the exterior portion of the abdomen is projected in inspiration, and withdrawn or depressed in expiration, while the central portion is *relatively* prominent in expiration.

Leaving the upper dorsal half as the thoracic region (for lungs and heart) we should presume that the lower half must maintain relations with the regions below the diaphragm ; accordingly, we find that the spinal nerves of the lower half pass down over the ribs and distribute to the muscles and integuments of the abdominal walls, including the diaphragm, while the adjacent ganglia of the sympathetic system, sixth, seventh, eighth, ninth, and tenth, send down through the diaphragm the splanchnic nerves, which form the solar plexus, controlling the abdominal viscera. The solar plexus comprises not only the ganglionic nerves, but branches from the pneumogastric and phrenic, especially of the right side.

Hence, we apply the hand on the lower dorsal region for the invigoration of liver, pancreas, stomach, bowels, and kidneys. It is the most inferior of the dorsal ganglia (tenth, eleventh, and twelfth, or twelfth alone) which form the lesser splanchnic (ganglionic) nerve which supplies the kidneys (which are located at the bottom of the dorsal region) by forming the usual plexus.

We understand the power of the solar plexus, formed by branches from the lower dorsal ganglia, when we look to its extensive ramifications. It sends branches along the abdominal aorta and forms the subordinate controlling plexuses of the abdomen, viz., the phrenic, cæliac, gastric, hepatic, splenic, renal, supra-renal, superior and inferior mesenteric and spermatic plexuses, which supply the stomach, liver, spleen, pancreas, duodenum, intestines, testes, and ovaries.

At the last vertebra of the dorsal region we find the ganglionic origin of the nerves of the kidneys and the kidneys themselves at the junction of the dorsal and lumbar vertebræ.

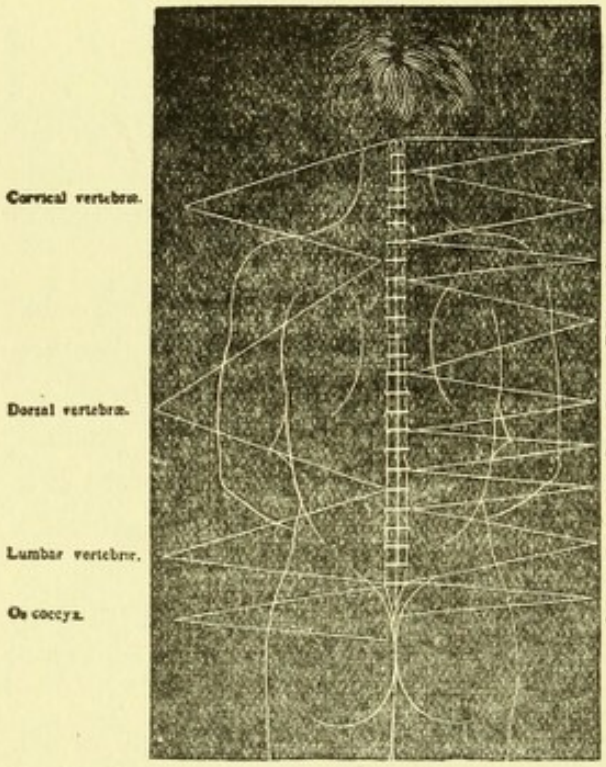
Thus the anatomical structure directs us to the lower half of the dorsal region for the treatment of the abdominal viscera generally — the kidneys being reached at the lower, and the liver at the upper vertebræ of this tract, their functions being also modified through the lumbar region.

Although the locations of the ganglia and spinal nerves are a correct guidance to locations of functions and methods of treatment, it is quite possible that the origins of functions in the spinal cord are materially higher than the nerves and ganglia by which they are manifested. Thus, according to Valentin, who has made the best illustrative experiments, contractions of the alimentary canal may be

produced by irritations of the roots of the dorsal, lumbar, and sacral nerves, or by the lower half of the thoracic ganglia, the lumbar and sacral ganglia, also by the splanchnic nerves and gastric plexus.

However, muscular contractions of the stomach have been produced by irritating the roots of the fourth, fifth, sixth, and seventh cervical nerves, and first dorsal, in the rabbit. The seventh nerve appeared to act on the pyloric end of the stomach. A similar effect was produced by irritating the first thoracic ganglia of the sympathetic. The first three cervical nerves and the adjacent ganglia acted on the œsophagus. We know also that the functions of the stomach are largely dependent on the origin of the pneumogastric in the medulla oblongata, as the pneumogastric controls the movements of the stomach, and has a controlling influence on the secretion of the gastric juice.

In an ingenious work by Dr. Sherwood on the "Motive Power of Organic Life," published at New York in 1841, a chart was given illustrating a method of diagnosis by pressure along the spinal column, finding a tenderness at various points corresponding to morbid conditions of organs. This chart would indicate that the sensitive points along the spinal column are somewhat higher in location than the nervous origins to which I have referred as a guide in Sarcognomy. The explanation probably is that nerves are affected by irritations above their origins. Their connections may extend higher than they can be traced. Dr. T. F. Beck has traced the splanchnic nerves as far up as the first dorsal ganglia.



The above is Dr. Sherwood's drawing.

Experiments in vivisection illustrate the physiology of the abdominal region. After section of the splanchnic nerves, a gentle faradic current applied to their peripheral end has caused increased action of the intestines. "Valentine found that the galvanization of the

superior thoracic ganglia revived the pulsation of the heart after it had ceased, and increased the frequency of the beats when already in action. Mild galvanization of the splanchnic nerves that arise from the six lower dorsal ganglia of the sympathetic increases, while strong galvanization diminishes, the peristaltic action."

It was formerly believed, and even supposed to be proved by experiments, that gastric digestion depends entirely on the pneumogastric nerve, although it is well known to be almost wholly a sensory nerve at its origin, and the digestive function has reappeared in the stomach after section of the pneumogastric, when time has been allowed to recover from the immediate effects of the injury. Moreover, the irritated secretions produced in the stomach by a poison appeared the same when the pneumogastric nerves had been divided as when they were whole. This was evidently under the control of the sympathetic or ganglionic nerves, which proceed from the lower dorsal ganglia to the solar plexus, and are combined with spinal filaments. Hence it is through that route we reach the stomach — the nerve tracts in which electric experiments demonstrate the control of intestinal movements.

The relation of the lower dorsal region to the abdominal organs was illustrated in a fact mentioned by Sir James Sawyer, in the "Lancet" (January 1, 1887), that a certain variety of backache is attributable to the condition of the colon. It is "a pain, aching dull and heavy," "extending right across the back," "in a transverse line about half-way between the inferior angles of the scapulæ and the renal region." "This pain I venture to attribute to a loaded colon," "fæcal accumulation in the large intestine," "I have found it disappear after the exhibition of an efficient cathartic," "this form of backache is a concomitant of habitual constipation." He found it relieved by a pill containing one, two, or three grains of Socotrine aloes, combined with one fourth grain of sulphate of iron and one grain of extract of hyosciamus. (I would remark that belladonna would be even better than hyosciamus as an adjuvant and corrigent of aloes, assisting evacuation but preventing irritation. A fourth of a grain would be a sufficient dose.)

In treating the lower section of the dorsal region for the viscera we influence also the regions supplied by its spinal nerves, viz., the muscles and integuments of the abdomen — the transverse oblique and rectus muscles, by which the abdominal viscera are kept in motion and their contents compressed, and by which the actions of coughing, vomiting and defecation are performed. Sir Benjamin Brodie relates that in a case of injury of the spinal column at the sixth dorsal vertebra, the muscles of the abdomen were paralyzed

and unable to co-operate in expiration ; hence coughing was impossible.

As the lower dorsal region for the abdomen supplies muscular power for its motion, so the upper dorsal region for the thorax supplies power for its action by the intercostal inspiratory muscles, and also moves the pectoralis major.

From this review it is apparent that the upper portion of the spinal cord tends to sustain the growth of the head and chest, and to expand the lungs, while the lower portion, developing the abdominal viscera and the lower part of the body, tends also by expiration to contract the development of the lungs and chest, and co-operates with the basilar organs. In all great muscular struggles the abdominal muscles are strongly contracted. In emotional character the thoracic region co-operates with the higher impulses and principles, and in growth it co-operates with the brain. Hence we draw the practical conclusion that increase of thoracic development is of the greatest importance in hygienic and moral culture, and that mountain regions or elevated plains produce a higher and more intellectual development of humanity as they cause a greater expansion of the chest.

In the lumbar region, the ganglia go to supply the lumbar plexus of the spinal system and also to the aortic plexus, which controls important arteries and plexuses and brings them into connection with the solar plexus.

The spinal lumbar plexus, formed by the lumbar nerves and the last dorsal, constitutes the chief motor power of the thighs, and by its lowest nerve, the lumbo-sacral, exercises an important control over the reproductive organs.

Thus it appears that the lumbar region has, through plexuses, an important control of the inferior portion of the alimentary canal, and the abdominal region of the spinal column extends from the middle of the dorsal region to the sacrum. Its lower portion is called the *cauda equina* (horse tail), as the trunk of the spinal cord does not usually extend below the second lumbar vertebra.

These propositions are illustrated by pathological and experimental facts. Brachet divided the spinal column of a dog between the third and fourth lumbar vertebræ. He kept him two days and fed him. Neither fæces nor urine was discharged — they accumulated in large quantity. He kept a young cat seven days after severing the spinal cord between the third and fourth lumbar vertebræ, and fed it as usual. The rectum and bladder became enormously distended, and a small portion only of fæces and urine escaped. In the case of a man whose spinal column had been fractured by a fall from a high tree, the lower limbs, rectum, and bladder were paralyzed and had to

be relieved mechanically, while he had no feeling of the necessity for evacuation.

Division of the spinal cord of the dog below the fifth lumbar vertebra destroys the power of the sphincter of the bladder, producing incontinence of urine. According to Budge, division at the fourth lumbar in the dog causes the bladder to become filled and distended, but does not affect the sphincter. He locates the genito-spinal centre in the dog at the fourth lumbar. The ano-spinal centre is located by Masius at the lower third of the fifth lumbar vertebra. Excitation of the third and fourth sacral nerves causes contraction of the sphincter, while section of the roots of the third, fourth, and fifth sacral nerves produced incontinence. After section of the third and fourth sacral the bladder could not be made to act by irritating either sympathetic or the upper portion of the cord. The lumbar region of the cord controls the relaxation of the sphincter of the bladder.

The relation of the lumbar region to the vital forces may be illustrated by reference to the anatomy of the lumbar nerves, of which the posterior branches supply the lumbar and gluteal regions as far as the head of the thigh-bone (trochanter) and the erector spinæ and interosseous muscles.

The anterior or principal branches are five, increasing in importance as we descend. The second is about twice as large as the first, and the third twice as large as the second. The fourth is larger than the third, and the fifth larger than the fourth, from which, with the aid of the fourth, originates the important lumbo-sacral nerve.

The lumbar region is accessible to treatment from the dorsal region, or ribs, to the sacral region, or hips; the anterior nerves just mentioned form the lumbar plexus, which by its spinal nerves and its ganglionic connections supplies the lower abdominal region externally, and internally the genital region, thighs, and a portion of the legs.

1. The first nerve gives off the ilio-hypogastric and ilio-inguinal (sometimes the ilio-hypogastric alone). Their names indicate their distribution. They pass over the ilium (hip-bone), the ilio-hypogastric going to the buttocks (the skin over the glutei muscles), and the hypogastric branch to the integuments of the hypogastric region (the lower part of the abdomen). It also gives muscular filaments to the lower part of the abdominal muscles and to the iliacus, situated interiorly, which lifts the thigh or lowers the trunk. The ilio-inguinal passes through the transversalis muscle of the abdomen, through inguinal region and external abdominal ring, to the integuments of the scrotum, the spermatic cord, the pubic and labial surfaces, and the upper, inner surface of the thighs. Thus we perceive that the first lumbar nerve has some association with the sexual region.

2. The second lumbar nerve gives off the *genito-crural* or *external pudic*, assisted by a branch from the first. This genital branch supplies the spermatic cord, the cremaster muscle and investments of the testis, and in the female the round ligament and external labium. It supplies also the integuments of the groin and the lower border of two of the abdominal muscles. This illustrates the association of the groin and the sexual functions.

The *crural* branches of the genito-crural, passing down with the external iliac artery, go to the integument of the front of the thigh, half-way to the knee. Thus through the genito-crural and ilio-inguinal, which are close neighbors in distribution, the upper anterior and inner surface of the thigh is associated with the sexual functions, and this group of sexual and upper crural influences belongs to the space corresponding to the upper half of the lumbar region, where we find also the sensibility of the posterior surfaces.

The second nerve, with some assistance from the third, also gives branches to the psoas muscle and originates the *external cutaneous*, which sometimes comes from the third and fourth. It passes out under Poupart's ligament in front of the ilium, to distribute along the outer and exterior posterior aspect of the thigh as far

as the knee, passing over the tensor vaginæ and vastus externus muscles—a region associated with great muscular energy.

The external cutaneous also sends a posterior branch to the buttock and upper part of the thigh.

3. From the second, third, and fourth in combination originates the chief nerve of the lumbar plexus, the *anterior crural* or femoral nerve, the chief muscular nerve of the thigh, supplying the muscles and integuments of its anterior and inner side. It supplies the vastus externus, vastus internus, rectus and crureus, pectineus and sartorius, and sends the long saphenous nerve (which accompanies the femoral artery and then the saphena vein), supplies the knee joint, and below the knee the anterior and inner border of the tibia and dorsum of the foot. In other words, it supplies the large muscles of the fore part of the thigh, which are much larger than the posterior muscles (excepting the tensor vaginæ and sometimes the pectineus), and gives nerves to the psoas magnus and iliacus internus. (The psoas muscle bends the trunk upon the pelvis.)

From the third and fourth descends the *obturator* nerve, which belongs chiefly to the adductor muscles that bring the thighs together. It supplies the adductors magnus longus and brevis, gracilis, external obturator, and sometimes the pectineus. It also supplies the hip joint and posteriorly the knee.

From this review it appears that the sexual region has some association with the upper lumbar nerves, but that their functions become more simply muscular and sensitive in the lower lumbar region until we reach the last, the *lumbo-sacral* nerve, where the sexual functions reappear in force and continue into the sacral region.

The lumbar plexus gives the nerve-power for the muscles and integuments of the thigh, with only a slight influence on the abdominal muscles at their lower margin, from the nerves nearest the dorsal region, which have some connection with the sexual integuments and functions. There is, however, in the whole lumbar zone of the trunk, the vascular nerve-power (vaso-motor) of the whole alimentary canal, and when we operate on the lumbar region we influence all the abdominal viscera. We know this experimentally, and when we look for the anatomical reasons they are very apparent in the ganglionic nerves, as the upper lumbar vertebra is opposite the solar plexus, which governs through the blood-vessels by its subordinate plexuses the whole abdominal and pelvic apparatus. Hence the hand applied at the junction of the dorsal and lumbar vertebræ, adjacent to the solar plexus and the end of the trunk of the spinal cord from which the lumbar and sacral nerves descend, covers a great centre of power for both the voluntary animal and the involuntary organic life. The lumbar enlargement of the cord extends through the twelfth and eleventh dorsal vertebræ. The lumbar region also sends out four or five lumbar arteries at each side, which curve around the vertebræ and supply the walls of the abdomen, as the intercostal arteries from the dorsal region supply the walls of the chest. The lumbar arteries also supply the adjacent portion of the back and spinal column, including the spinal cord.

The entire vascular circulating power of the abdomen is adjacent to the lumbar vertebræ. The iliac arteries for the lower limbs and pelvis bifurcate opposite the fourth lumbar vertebra, and from that locality to the upper end of the lumbar vertebræ we find, first, the cæliac plexus and artery supplying the stomach, liver, and spleen, by

its three branches,—the superior mesenteric plexus and artery supplying the small intestines and half the colon, the inferior mesenteric plexus and artery supplying the remainder of the colon and the rectum, and between the two mesenteric arteries, the spermatic.

The lumbar ganglia send branches to the aortic plexus (a continuation of the solar), which originates the inferior mesenteric and part of spermatic, and terminates in the hypogastric, to which the lumbar ganglia also send branches. The hypogastric is especially the plexus of the sexual organs.

Hence, although the nerve power of the abdomen connects with the lower dorsal region, the lumbar region is equally important, as influences applied to the lumbar region affect everything from the diaphragm to the end of the rectum (the diaphragm included), through the arteries, and the ganglia and plexuses which control the circulation and organic life of all the abdominal organs. Moreover, the organs themselves are opposite the lumbar region, the stomach being opposite the first two lumbar vertebræ, the duodenum opposite the third, and the mesentery and umbilicus opposite the fourth. On the same level we find the mesenteric glands tributary to nutrition, and the receptaculum chyli adjacent to the second lumbar. The liver alone has a higher location, being opposite the last two dorsal vertebræ. Hence we reach the liver, stomach, spleen and pancreas at the junction of the dorsal and lumbar vertebræ, and hold the nutrient absorption between our hands when one is applied above the umbilicus and the other at the two upper lumbar vertebræ. As the lumbar region contains the chief motor power of the lower limbs, there must be a close connection of the bowels and the muscles of the thigh, which is evinced in the tendency of sedentary pursuits to promote constipation, and the prompt effect of walking in renewing a diarrhœa or cholera which has been arrested and which can be kept in check only by lying down.

The lumbo-sacral, much the largest of the lumbar nerves, comes from the fifth nerve and a branch of the fourth. It enters the pelvis, and, joining the first sacral nerve, it becomes a part of the sacral plexus, which is thus constituted by the last two lumbar and four sacral nerves. The lumbo-sacral, being an important nerve, its origin is probably a chief source of the sexual energy coming from the sacral plexus. Near the lumbo-sacral nerve we find the internal iliac artery, which supplies the sexual region, by pubic, pudic, uterine, vaginal, vesical, and hemorrhoidal branches.

The third and fourth sacral nerves, by their anterior branches, combine with the adjacent ganglionic nerves, and go to the hypogastric plexus of the sympathetic system, which controls the sexual functions.

As my external nervauric experiments showed the junction of the lumbar vertebræ and sacrum to be the chief seat of the sexual function, it is interesting to observe that the sexual functions have sources above and below the lumbo-sacral junction (the lumbar nerves above this point have a connection with the sexual apparatus, the external pudic or genito-crural arising from the second lumbar nerve), and that anatomy evidently indicates the lumbo-sacral region as the chief source of the sexual functions, the derangements of which, it is well known, are commonly manifested by pain or tenderness at the lumbo-sacral junction.

Longet and Breschet regard the lumbar portion of the spinal cord as the nervous centre of control for uterine action, but it is not certain whether the major portion of the sexual functions depends on the spinal or on the adjacent ganglionic structure, as the division of the cord in the middle of the lumbar region of a bitch by Brachet did not prevent an impregnation soon after, and he also states that impregnation occurred in a woman in whom paraplegia was so complete that she had no sensation in the sexual act. This, however, would make no material difference in nervauric treatment, as the operations on the spine affect the adjacent sympathetic region.

The lumbo-sacral sends off a branch to the glutei muscles, which have in consequence an association with the sexual function, known to voluptuaries; and the lower lumbar ganglia, by their connection with the aortic and hypogastric plexuses, are in close relation to the sexual functions. Moreover, the lumbo-sacral junction is adjacent to the origin of the internal iliac artery, which supplies the whole pelvic viscera, and faradization of the lower lumbar region acts most efficiently upon the bladder.

The *sacral plexus* thus, by its downward extension, brings the leg and foot and posterior region of the thigh into close association with the pelvic viscera (especially the sexual organs), which are supplied by its anterior or internal branches. These internal branches are the hemorrhoidal, vesical, vaginal, uterine, and pudic, going to the pelvis and perineum, their names indicating their destinations — the regions of the rectum, bladder, and sexual organs. The vesical or bladder nerves supply filaments also to the vesiculæ seminales, prostate gland, and female urethra. The *pudic* nerve is the chief nerve of the genital organs, and comes chiefly from the third sacral. The continuation of the lumbo-sacral in the first sacral nerve produces under stimulation the flexion of the leg, foot, and toes.*

* The sacral nerves give branches posteriorly to the sacro-lumbalis muscles and integuments of the nates and anal region. The lumbo-sacral and first four sacral nerves unite in forming the *sacral plexus*, which is rather a large nerve than a plexus. This plexus, adjacent to the rectum, sends off two great nerves — the greater

The last lumbar and the third and fourth sacral nerves send branches to the *hypogastric plexus*, which is the chief immediate control of the sexual apparatus. The external sexual locality therefore for Sarcognomy should be the lumbo-sacral junction and space extending above and below it, and the entire lumbar and sacral regions may be regarded as having sexual influences, through the surfaces at and around the sexual organs, and by connections with the hypogastric plexuses. Moreover, we find opposite the superior lumbar vertebræ the spermatic arteries, a source of sexual power, as they supply the male testes and the female ovaries. (In birds, the kidneys and supra-renal capsules lie in contact with the testes and the ovaries, and in man the testes in the embryonic condition are near the kidneys.)

The *hypogastric plexus* is formed from the sacral ganglia, aided by the third and fourth sacral spinal nerves, and the inferior mesenteric plexuses with which it connects. This is especially the sexual plexus, as it follows and controls the arterial supply of blood to the sexual organs.

It is difficult in such a commingling of nerves, where the sexual powers are reinforced from different sources — from the upper and lower lumbar and sacral regions, to fix upon its chief centre anatomically; but nervauric experiments and the principles of Pathognomy direct us to the *lumbo-sacral location* as its commanding centre at the spine, as the sexual organs themselves are the immediate seat of the functional energy and excitement. In this matter, as in all other developments of Sarcognomy, I have followed experiment without regard to anatomy — only looking to it afterwards to see that it gave no incompatible facts. As to the lumbo-sacral junction, anatomy and physiological experiments confirm the nervauric discovery, showing the lumbo-sacral junction to be the sexual centre, although the distribution of nerves might have led to a different opinion.

Budge, who discovered the cilio-spinal centre (governing the iris), "has discovered a similar centre in that portion of the spinal cord which corresponds to *the fourth lumbar* vertebra. By faradization of

and lesser *sciatic nerves*. The *great sciatic*, the largest nerve in the body, is the continuation of the sacral plexus, deriving filaments from all the nerves that supply the plexus. The great sciatic supplies the obturator internus, the gluteus, and the flexor muscles of the thigh, the adductor magnus, biceps, and external rotators and external surface of the ham, and sends down an important continuation, the popliteal or posterior tibial, which ends in the external and internal plantar, and becomes the chief nerve of the muscles and integuments of the leg and foot. It supplies the integuments of the leg, and the gastrocnemius, plantaris, popliteus, and soleus muscles, also the tibialis posticus and long flexors, and the ankle and the sole of the foot. The plantar nerves supply the muscles of the foot.

The smaller sciatic nerve supplies the gluteus maximus and gracilis, and the integuments of the upper and posterior aspect of the thigh to the knee, and supplies some filaments to the flexor muscles.

the same, powerful contractions of the vasa deferentia, the bladder, and the lower portion of the rectum are caused. The same effects are produced by stimulating a small ganglion, situated in the neighborhood of the *fifth lumbar vertebra*, and which receives branches from the third and fourth lumbar nerves. This ganglion Budge has called the *genito-spinal ganglion.*"

Dr. Beard has also observed the influence of this region. He says: "If a strong current can be applied over the lower portion of the spine, between the upper borders of the ossa innominata, a slight sensation is sometimes, though by no means uniformly, communicated to the rectum and the male genital apparatus, the penis and the testicles, through the spinal nerve-supply."

Still more remarkable is the mingling of the locomotive and sexual powers in the spinal system. The lumbar region, chiefly for the thigh, and the sacral region, chiefly for the leg (and posterior of the thigh), are the sources of the sexual powers, which thus arise from the midst of the greatest physical force. Hence, in their maturity, they develop or sustain the greatest energy, as we see in the contrast between the sound and the emasculated animal. The active life, which develops the greatest muscular energy, also develops the greatest virile force, and hence population is not checked by the struggles of poverty so much as by the indolence of wealth.

The consociation of virility and the more turbulent energies corresponds with the usual course of nature. The season of sexual love among most animals is a season of restless energy and often of fierce combat. Among men it is the source not only of social animation but of a great deal of turbulent lawlessness, jealousy, and violence. The impetuous lover fights all rivals or obstacles, and sometimes when disappointed is ready to murder the woman who has rejected him and terminate his own life in his blind fury. The sacral region is a region of insane tendencies and of great force.

The sexual *power* which belongs to the spinal system, and which is an aggressive impulse, is distinct from the sexual sensibility and excitability which belong to the sexual organs, the influence of which, intemperately used, tends to debility and exhaustion. Both belong to the lower end of the trunk, which antagonizes the head and summit of the chest, according to the law of antagonism which is a fundamental principle of Biology.

The lower limbs are especially antipodal to the brain, and in this they coincide with the excretions of the pelvis.

The foot is the most thoroughly anti-cephalic region, with the strongest tendency toward sleep or coma, and it is dependent upon the sacral plexus through its continuation, the great sciatic nerve.

The sacral plexus is in close relation with the fecal and urinary matters which depress the nervous system. The foot, under the influence of warmth, is effective in subduing the brain to sleep, and under the influence of fatigue from prolonged walking lowers all the cerebral powers.

It would then seem probable that the pelvic distributions of nerves from the sacral plexus should have a similar anti-cephalic and lethargic character, and in fact we find in the pelvis the influences most hostile to cephalic integrity, tending to develop every form of hysteria, coma, paralysis, dementia, and insanity.

The pelvic region receives the dead substance rejected from all the organs — devitalized, benumbing, debilitating. The solid waste of the body comes to the colon and rectum, the fluid waste comes by the kidneys and ureters to the bladder. The urea thus discharged is a narcotic element, torpefying to the brain, and we find in the pelvic region at the mons veneris a tendency to lethargy and coma similar to that which, on the head, appears under the jaw just above the larynx — a quality manifested not only in cerebral disorders, but in the manner, when largely developed, as was seen in Mr. Webster, in whom, notwithstanding his great development of brain, there was an extreme dullness and slowness of mental action, quite a contrast to that of Mr. Clay and Mr. Calhoun.

The explanation of this lethargic tendency at the mons veneris, which quite surprised me when I discovered it, is found in the narcotic character of the contents of the bladder behind the mons. It is a curious coincidence that the pubic region in question receives nerves (the ilio-scrotal or ilio-inguinal branch) from the musculo-cutaneous, a branch of the first lumbar nerve, which is in close proximity to the kidney from which the narcotic element takes its departure. The ilio-scrotal supplies the skin of the pubis, penis, scrotum, and female labia. The nerve is thus at each end in relation with narcotic impressions.

The lower pelvic region is the region of insanity and all forms of mental and cerebral degeneracy — that is, predominant irritations and excitements in that region produce all forms of cerebral derangement.

How nearly parallel these forms of cerebral disorder of pelvic origin are to the forms of mental degradation produced in connection with parts below the knee I will not discuss at present.

We have now hastily surveyed the spinal column, the repository of vital forces of the body energized by an influx from the brain above. We perceive that from its summit, which co-operates with the brain and summit of the lungs, to its lower end devoted to the legs, it is a

collocation of unitized forces, acting on the different segments of the body by its voluntary spinal nerves, by the adjacent ganglia, and by the blood-vessels those ganglia control, thus determining all activity and all growth.

The nervauric healer, with these principles impressed on his mind, will give more attention to the spinal region than to any other portion of the body.

The instant control of the spinal cord over all parts of the body renders it the channel of all sympathies, as we perceive when the cooling of one hand or foot has a cooling influence on the other, which was illustrated by the experiment of Dr. James J. Putnam on frogs, in which electrization of one foot produced contractions of the blood-vessels of the web of the opposite foot, and by the experiment in which Brown-Séquard showed that pinching one arm caused a fall of temperature in the opposite arm through its effect on the cervical spine.

Correlation and Combination of Functions.

Notwithstanding the distinct specification of the several regions of the spinal cord which has been shown, we cannot speak of these as distinctly separate and isolated regions, for every organ is in some way related to other portions of the cord than the region of its spinal control, and all inferior organs depend upon the immediate superior tract, through which communication is maintained with the brain and its continuations. Van Kempen found that a longitudinal section in the middle of the spinal cord, along the fifth, sixth, and seventh cervical vertebræ, in dogs and rabbits produced a partial paralysis in the posterior limbs, seeming to indicate that nervous fibres for the lower limbs decussated in the cervical region. (This experiment illustrates the galvano-tonic contractions of Remak, who excited contractions in the anterior limbs by galvanizing the posterior.)

It is an interesting coincidence that the region of the brain, at the posterior part of the sagittal suture, which corresponds to the cervico-dorsal region, is recognized by recent experimenters in vivisection as the seat of controlling power for the posterior limbs.

Pathologists might be puzzled to account for paralysis in the lower limbs by affections in the cervical region, which this experiment would explain. It also adds to our knowledge of the commanding importance of the cephalic region in controlling everything below it. The regions of the neck through which we excite the lower limbs in acting on the brain, are closely associated with the cervical region that controls the upper limbs. The crural region of the brain is marked on the neck, through which we reach it, close to the brachial

region of the spine, the source of the brachial plexus, and the upper and lower limbs are curiously parallel in their psychic relations, but in higher and lower spheres.

Anatomy further illustrates the commingling of functions by the fact that spinal nerves are not limited in their connection to the spot where they appear to unite with the cord. Sensory nerves, when they unite with the cord, run a little way up or down, or in both directions, and then cross to connect with the opposite side and carry out the general law of decussation. We know not how far the filaments pass before effecting their connection with some ganglion-like substance as their origin.

The HEART not only responds to the upper dorsal region, but by its intimate dependence on the three cervical ganglia is brought into close relation with the brain and the cervical region of the cord, which associates with these ganglia. Moreover, it has close relations with the third, fourth, and fifth cervical nerves, the origin of the phrenic, by the phrenic distributions which supply the pericardium and the vena cava. The right phrenic goes to the lower vena cava and the adjacent portion of the right auricle, while the lower vena cava and contiguous portion of the right auricle are supplied from the mixed phrenic and ganglionic nerves of the diaphragmatic plexus. Irritations of the phrenic nerve have produced contractions of the right auricle and diaphragm in dogs. It is clear, therefore, that both inspiration and circulation depend upon the cervical region, and are not so much centralized in the medulla oblongata as commonly supposed. The phrenic nerve communicates extensively with the branches of the middle and inferior cervical ganglia, the motor ganglia of the heart, and supplies the pericardium from its branches opposite the third rib, and also from its ramifications at the diaphragm. Moreover, the costal pleura (a portion of which is in the precordia over the heart) is supplied with its sensibility by the phrenic nerve, and thus connected with the middle cervical region. This region was intimately concerned, as well as the pericardium, in the faradization by which Duchenne roused the action of the heart.

Again, the heart has some connections with the lower dorsal region, for the solar plexus, originated by the splanchnic nerves coming from the sixth to the tenth dorsal ganglia, sends up branches through the diaphragm to the pericardium, by the diaphragmatic plexus.

The pulmonic and cardiac regions lie together in the cord, and the lungs are supplied largely by the pneumogastric nerve, which also supplies the pulmonary pleura, and is the great sensitive nerve of the thoracic cavity, the sensitive excitation of which is so subduing to the heart. Thus the heart is in relation to pulmonic sensibility and the

origin of the pneumogastric at the medulla oblongata, as the moderator of its action. The influence of the viscera is subduing or softening, while that of the spinal column is invigorating. The anterior central portion of the chest, corresponding with the anterior portion of the cerebrum and identified with the pneumogastric nerve, has the subduing influence which is shown in our experiments on the brain, and in the stimulation of the pneumogastric nerve, while the spinal column, like its associate posterior region of the brain, gives to the heart its various forms of energetic action.

Adjacent to the four upper dorsal vertebræ we find the recurrent laryngeal nerves — the left rising lower than the right, — beneath the aortic arch, which ascend to the larynx, and are associated with the cervical ganglionic nerves. Hence, through this region comes the power of the voice, and the power of closing the larynx firmly, which comes into play when we exert our maximum strength. The voice is the most spiritual of all the physical powers of the body, and it comes through the cephalic region, as it comes through the power of the spinal accessory nerve to the recurrent laryngeal, and the spinal accessory rises by several roots above the seventh cervical, and partly from the medulla oblongata, which is probably the real source of the vocal power. In this region also, we have the descending branches of the pneumogastric, which join the cardiac plexus and give sensibility and sedative relaxing influences to the heart, as well as the anterior and posterior pulmonary plexuses, the latter joined by the nerves from the third and fourth dorsal ganglia, and going to supply the substance of the lungs, which are partly supplied from the cardiac as well as the pulmonary plexuses ; in which we see a further illustration of the combination of cardiac and pulmonary energies, and their joint relation to the pneumogastric nerves and the upper section of the cord.

Again, the cervical ganglia which control and sustain the heart are at the same time the regulators of the brain, determining the amount of circulation in its anterior and posterior regions and in the spinal cord ; and, as the brain demands a larger supply of blood, or the muscles demand more power, they start an increased cardiac energy to supply the demands created by the passions ; but when the gentler emotions demand peace, their responsive region (the upper pulmonary) rouses the pneumogastric nerve, tranquillizing and relaxing the heart.

The heart is closely related to the diaphragm, to which it is so closely situated, and their controlling regions in the brain and cord are so closely connected as to insure their co-operation. The same exertion or passion which accelerates the pulse also increases the action of the diaphragm.

The entire study of this subject illustrates the supreme location of life in the brain and the cephalic portion of the spine and trunk which control and contain the heart. The location of life in our supreme psychic organ enables us to understand how easily it may be sustained or reinforced by psychic power.

The lack of definite limitation in the nerve-supply of organs is apparent in all parts of the cord. The splanchnic nerves for the abdomen are connected no higher than the sixth dorsal ganglia, but their fibres may be traced up as high as the third or the first, thus giving the abdominal region a nervous association with the lungs, heart, and brain. In the sexual apparatus not only do we trace a definite anatomical connection (verified by nervauric experiment) between the sexual organs and the sacral region and lumbo-sacral junction, but we find an important influence in the lumbar region, as the genito-crural nerve arises from the second lumbar, and the lumbar ganglia go to form the lumbar, aortic, and hypogastric plexuses, which control the pelvic viscera; and we observe that the spermatic arteries which supply the testes and ovaries originate at the head of the lumbar region, controlled by the spermatic plexus, which, derived chiefly from the renal, is thus connected with the lowest dorsal region, which originates the minor splanchnic nerve, the source of the renal plexuses. Hence we speak of the *genito-urinary* organs, which are anatomically connected.

Thus in the intricate machinery of life there are so many forces brought to bear upon every organ, to stimulate, to modify, or to arrest its action, that if we were not guided by a comprehensive philosophy and an exact knowledge of the dominant laws, we might fall into serious mistakes.

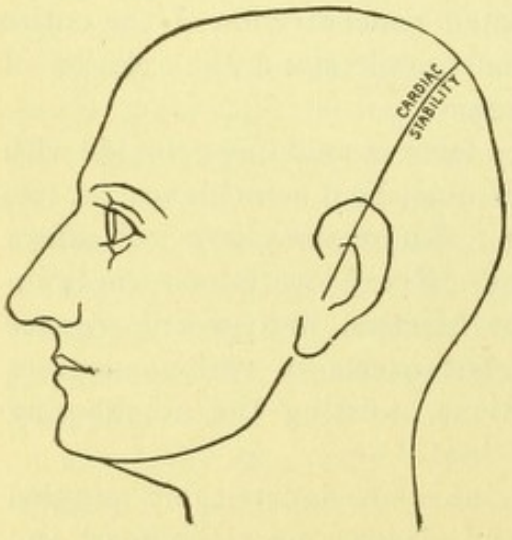
In localizing the source of any function we locate the more important source of action and not an isolated concentration of the entire power. The nervauric physician should understand the relation of each organ to the entire nervous system.

Finally, it may be asked, how do the facts of anatomy coincide with the localities of Sarcognomy? There must be a coincidence, as two classes of facts cannot be in collision. Sarcognomy does not affirm an isolation or separation of influences. Every location on the brain or body, though it may influence one function in a greater degree than others, is not limited thereby, but exerts in various degrees modifying influences on other functions, assisting the neighboring and checking the most remote.

The nerve forces of the heart and lungs are inextricably mingled with each other, both in the ganglia and plexuses near the heart and in those along the spine, and even the lower dorsal region has rela-

tions to the heart. The heart and aorta confront the entire tract from the second to the tenth dorsal vertebra, the body of the heart occupying the space from the fourth to the tenth vertebra, and the arch of the aorta corresponding to the second and third vertebra. The trunk of the aorta extends down to the fourth lumbar vertebra, dividing then into the iliac arteries that supply the pelvis and lower limbs. Hence the nervauric influence of the hand may reach the heart at any point from the third to the tenth vertebra in consequence of its proximity, and that influence would be specially effective from the third to the sixth vertebra, because it would reach the cardiac plexuses and ganglia, the immediate source of its action. The sixth vertebra may be considered the central locality for cardiac influence. The fourth vertebra is on the level of the origin of the aorta. Anteriorly, the heart corresponds to the space between the second and sixth ribs (the aorta rising to the first), and its lower end touches the wall of the chest two inches below the nipple and one inch nearer the median line. (The base of the sixth rib in front corresponds with the tenth dorsal vertebra behind.) The heart may be reached in front, but the frontal influence is feeble compared to the dorsal, and the left side, which is the more muscular side of the heart, is toward the back. The intercostal nerves and arteries, which supply the chest around the heart, proceed from the space between the second and sixth dorsal vertebræ. The sympathetic psychic connection of the sixth dorsal region with the brain shows that it is adapted to sustain healthy and vigorous cardiac action. A calm and firm action of the heart is produced by the influence of the cephalic region of the cord, which is best adapted to sustaining the action of the brain.

As the facts of Sarcognomy thus locate the best cardiac power in the upper dorsal region, which is free from the exhausting violence of the neck and of the lower part of the body, we shall find the corresponding beneficent cardiac influence of the brain in the upper occiput, on a line from the cavity of the ear to the centre of power on the median line (usually indicated by the central radiation of the hair.)



The hand stimulating this spot produces a tonic effect — a just medium between the opposite influences of the gentle anterior superior region and the violent force of

the posterior inferior. This tonic power for the heart is near the centre of power, which modern anatomists have confirmed, calling it the superior parietal lobule and giving it the command of the locomotive power of the lower limbs.

The vigor given to the heart by this location is shown in a strong but normal pulse. In passing forward upon the brain, the pulse gradually softens — in passing back downwards it becomes harder or stronger, indicating an increased blood pressure.

There is no more decisive way of showing the impressibility of the brain and its physiological control of the body, than thus to stimulate and modify the action of the heart by applying the hands on different parts of the head. No psychic effects are quite convincing to those who have been thoroughly educated into collegiate scepticism, for they are well armed with fanciful hypotheses and shrewd suspicions against anything that is not physical; but the silent testimony of the pulse is unanswerable; and when given to a Boston committee in 1843, Doctor Flint, who felt the pulse, said to me, "Your experiments are too perfect."

A powerful and tumultuous action of the heart is produced by the three cervical ganglia which co-operate with the basilar region of the brain, the seat of the turbulent impulses and animal force which we rouse by placing the hands on the neck near the cranium. The large neck is a well-known indication of strong circulation and strong passions. The cervical ganglia are equally cephalic and corporeal in their functions, and sustain the brain and heart in scenes of the wildest violence.

The anatomical commingling of nervous forces which we find serves as an additional illustration not only of the sympathies of organs, but of that intimate correlation and blending of functions which is revealed in the study of the brain, in which we find no organ which has not a diffusive influence, extending beyond its own jurisdiction into the sphere of other functions.

The intimate and powerful sympathies of the stomach with the brain and lungs, and its controlling influence over the vital energies generally are explained by its relation to the pneumogastric and phrenic nerves, the solar plexus and the lower dorsal region of the spinal column as well as the gastric region at the base of the middle lobe of the brain.

The solar plexus exercises a dominant influence over all below it. The lower dorsal region and its correspondence in the brain, the region of Business Energy, give a general capacity for the active duties of life. Hence, when they are enfeebled or oppressed by the condition of the stomach, with which they are associated — by its

load of undigested food, its morbid contents, or oppressive, nauseating medicines, there is a general unfitness, incapacity, and aversion for our daily duties, and inability to make any great exertion, whether physical or intellectual, especially anything requiring skill.

As the gastric region of the brain (in front of the ear) is antagonistic to fortitude and energy, any very strong impression on the stomach enfeebles the nervous energies, but as it is a region of great sensibility (the epigastric region corresponding to Sensibility in the brain) the medical or hygienic influence of everything it receives is so strongly felt as to affect the whole constitution, and medicines swallowed may affect the system instantaneously, prior to any absorption.

The best condition of our energies is after the process of digestion has ceased and the nourishment been absorbed, the stomach remaining quiescent. Although the abdominal organs support the constitution by their contributions through the thoracic duct, they tax the constitution to the extent of the nervous energy they require. Hence the highest nervous and psychic conditions may be attained in climates which require but little food.

I would remark in conclusion, that in nervauric and electric treatment we are not to confine our attention, as has been the fashion, to the cerebro-spinal system, overlooking the immediate agents of vital functions, for it is well established that the immediate agents of all vital processes are the ganglionic nerves or ganglia. Animals may exist without a cerebro-spinal system, and the human fetus may be developed without either brain or spinal cord. To the ganglionic or subordinate system nature adds a controlling spinal system, and to this adds a controlling brain. But the ganglionic system, thus overruled, carries on the machinery of life; and when we treat the spinal column we control the adjacent ganglia as well as spinal nerves, thus controlling circulation, sensation, and unconscious action in the viscera. Physiologists have not given sufficient thought to this commanding relation of the spinal cord to the viscera, and none to the corresponding definite relations of the brain, nor have the ganglionic functions been studied in a practical manner for local treatment.

CHAPTER VI.

PRACTICAL DIRECTIONS FOR THERAPEUTIC SPINAL TREATMENT.

UNDERSTANDING the foregoing exposition of the spinal powers, the operator will have little difficulty in treating the spinal column — *the most important region of the body for the healing art* — according to the following directions, recollecting that we stimulate the impressible temperament by the application of the hand, by gentle percussion, or by the negative pole of a gentle electric current, and that whatever we do upon the body may be aided by treating the corresponding region of the brain.

1. To invigorate the brain and all our energies, stimulate the junction of the cervical and dorsal vertebræ, or union of the neck and the trunk.

2. To reinforce this region, stimulate the region of Sanity, just below the arms. The union of the two functions produces a greater effect as they are analogous or correspondent. The region marked Sanity produces psychic or moral firmness and self-control, and suppresses all disorders of the nervous system.

3. For the more complete invigoration of the brain and the entire constitution, the treatment may be applied not only to the cephalic region of the spine, but upon the entire shoulders, and the arms down to the elbow.

4. While stimulating the cephalic region, the effect may be assisted by dispersive upward passes from the margin of the ribs in front (region of Disease). If a galvanic current is used, the positive pole applied by broad rheophores below the margin of the ribs anteriorly and the negative on the cephalic region, will produce a great concentration to the cephalic locality,—a very tonic, sustaining influence. The entire upper portion of the back has a tonic, sustaining character.

5. If it be desired to use the brain power for intellectual purposes, we should also stimulate along the course of the sternum, in conjunction with the cephalic spinal region and Sanity, by the hands, by gentle faradic currents, or by the reciprocal galvanic.

Across the lower end of the sternum, between the mammæ, it could be directed to impressional, psychometric and clairvoyant investi-

gations. If the object should be a general mental elevation to a lofty plane of thought, opening the mind to spiritual influx, we may stimulate the region of Inspiration, on the side, parallel to the anterior line of the arm, which corresponds to the temples — the region of Ideality, Modesty, Reverence, and Sublimity.

6. If we wish to use the mental energy in speech (conversation or oratory) we should combine with the Cephalic the Pulmonic region, just below it (marked Oratory), which would co-operate admirably with the region of Inspiration. For mediumistic speech we need both Inspiration and Idealism — the latter being easily covered by the hand across the lower end of the sternum. The term Idealism is used for the whole Ideal region, including Imagination, Spirituality, Marvellousness, and Somnolence.

7. If we would use our mental energy for physical achievement, we should combine with the Cephalic region that of Vital Force and the entire thigh; also the lumbar region and the organ of Force behind the lower part of the humerus on the trunk.

8. If we would use it for an ambitious career, we should excite the energies of the arms — especially the regions of Ambition and Love of Power, on the upper arm, and the whole space across from tip to tip of the shoulders. On the brain place one hand across the upper occiput, behind the organ of Firmness.

9. If we would use it for the attainment of moral excellence and perfection, we should extend the stimulation from the cephalic region, over the shoulder, on the front of the chest, as far as the nipples. The corresponding stimulation of the upper surface of the brain in the middle region (across Religion, Hope and Love) is in many cases highly important. The bright, calm, and happy feeling produced by this region subdues restless and unpleasant passions, and sustains the activity of the brain, giving a capacity for pleasant intellectual and social intercourse, and bright intellection. Hence the region of Love and Hope may be beneficially stimulated in connection with Health and the occipital energies generally. A happy influence may be produced by combining the coronal and basilar regions of the brain — one hand being across the region of Love and the other around the base of the cerebellum, thus giving physical and psychic vitality in harmonious combination. This harmony is necessary to high health. Paralysis may be due to a decided predominance of the basilar organs and the failure of the higher sentiments to maintain the cheerful activity of the brain. Over exertion prompted by unbalanced selfish impulses is one of the main causes of brain exhaustion and consequent prostration of health. The cultivation of the affections in family life is the principal means of maintaining a

healthy balance and supporting the normal condition of the brain — hence the greater longevity of a married than a celibate life, which is always the effect of a happy marriage. There is a considerable class in whom it is important to stimulate the upper surface of the brain and the region including the mammæ and upper surface of the shoulder.

There is an obvious reason for this in the principle that all unbalanced action is injurious. The basilar forces leading to physical exertion continually tend to brain exhaustion, carrying its vitality into the body, as we see in the complete nervous prostration after violent efforts and the stultified dullness produced by a life of excessive labor. On the other hand, a life in which the activity of the higher emotions is greater than that of the animal forces is accompanied by a superior condition of the brain. Thus do love and religion become conservators of health, while excessive culture of the muscular system is at the expense of the brain; and athletes in training sometimes diminish their power by this reduction of the vitality of the brain. Excessive exertion may result also in that hypertrophy of the heart which is so injurious and destructive to the brain.

The importance, and indeed the absolute necessity, of cultivating the higher sentiments for the maintenance of health is demonstrated by the frequent occurrence of paralysis and death from diseases of the upper surface of the brain; and the wonderful power of enduring fatigue and privation produced by the sentiments of hope and courage, which belong to the upper surface of the brain. Hence in the treatment of patients it is often necessary to stimulate the upper surface of the brain for its calm, cheerful, and sustaining influence. The best results are produced when the operator can give that aid from the energy of his own higher faculties. Indeed no one is really fit for the duties of a physician who has not strong sentiments of love, hope, and firmness.

10. If our chief object is to encounter enemies and difficulties, we may also stimulate the lower posterior half of the body, especially the region on the level of the lumbar vertebræ and below. If our object is to gain social influence and ascendency, we may stimulate the whole of the upper posterior surface of the trunk and the entire arms, or at least to the elbow. From the top of the shoulders downward for a space of ten or twelve inches may be regarded as the social region.

11. To stimulate the Cephalic region *in the head*, we may touch the regions of Firmness and Dignity (marked Self-respect). To produce a strong and harmonious combination of cephalic energies, we may

extend the hand across Firmness and Dignity, so far as to include the regions of Sanity and Magnanimity (at the prominent centre of the parietal bone) thus covering the posterior part of the cephalic region of the brain. In all cases we improve the sustaining faculties by passes upward and backward from Disease and Insanity (the cheek-bone and the under-jaw regions) towards the crown of the head, the capillary centre. The pass is a light brushing movement with the fingers.

12. To invigorate the lungs in any condition whatever, we may stimulate the upper half of the dorsal region (the six upper vertebræ). Precision in confining the hand to one locality is not desirable in therapeutic treatment, for adjacent localities are always co-operative. The pulmonic zone extends around the chest in the direction of the ribs, nerves, and blood-vessels; but on the frontal, sternal surface we have not the elements of vigor. Hence we do not usually extend our manual treatment, except at the summit, much beyond the side, in which we find a region of Inspiration (near the ends of the intercostal arteries) (see map) corresponding with the organs of Sublimity and Reverence — a region which animates the lungs, and prompts a fuller breathing by the ribs, but does not impart permanent vigor or tonicity, and would, therefore, not be beneficial in inflammatory conditions, which should be counteracted on the tibial surface of the leg. Nevertheless the upper frontal surface of the chest promotes the fulness and circulation of the lungs (in connection with pleasing emotions) and may therefore be used when we wish to increase their circulation, especially in asthmatic conditions and irritable states of the system. Moreover, any operator of a benevolent, sympathetic temperament and strong vitality may do good, however ignorant, by placing his hands upon the patient, though without producing the speedy and thorough cure to which he would be guided by Sarcognomy. A state of irritation in the lungs may be soothed by the anodyne influence of the region of Patience, at the top of the shoulders. Bronchial irritation and congestion may be overcome by the regions of Repose and Coolness, which operate much like a combination of quinine and hyoscyamus or opium. The hyperemic conditions of pneumonia may be best counteracted by the tibial region of the leg and the foot, on which we apply the hands, or to which we send an electric current from the anterior surface of the chest. In those who are less impressible, a similar effect may be produced by hemastasis, by inserting the lower limbs in hollow vessels (the pneumatic boot) from which the air has been partially extracted by an air-pump, so as to draw the blood with great force into the limbs, giving prompt relief to the congestion of the lungs. (See chapter on Hemastasis.) If such apparatus is not in

reach, ligatures around the thighs to produce an accumulation of blood in the limbs for a few hours will answer the same purpose, though less efficiently.

In speaking of the frontal region of the chest and the brain as deficient in vital force, I do not mean that their influence is objectionable. On the contrary, though deficient in vital force they contribute to the general activity of the brain, and serve to call out the occipital energies by their laws of association. This is especially true of the summit of the chest, from the shoulders to the mammæ inclusive. This region is correlative with that of Health — that is, it uniformly co-operates with it. Hence there is great propriety in combining the anterior and posterior stimulation of the upper part of the chest, which develops the noblest and most hygienic elements of the constitution.

13. To treat the lungs through the head, we operate on the corresponding regions to those we treat on the body, giving vigor by the upper occiput, anodyne influence by Patience, Heroism, and Repose, full inspiration by the temples, bronchial relief by Sleep and Coolness, and deep diaphragmatic respiration by the respiratory region below the mouth. As the exercise of the thighs by running, leaping, or ascending heights promotes deep diaphragmatic respiration, so does the stimulation of the thigh (or of the crural region) or their expansion by hemastasis. The sedative and cooling effect of the tibial region cannot be distinctly produced through the neck on the brain, owing to the variable position of the head, but may be approximated on the lower part of the neck.

14. In treating pulmonary diseases it is always beneficial to reinforce the pulmonary vitality by stimulating the pulmonic region of the spine, but not so beneficial to stimulate the region of Inspiration, except when respiration is imperfect, the lungs being dry, constricted, or asthmatic. Congestive conditions of the lungs, such as pneumonia, or irritated conditions approximating pneumonia, are benefited by stimulating not only the pulmonic region, but the whole posterior thoracic surface, which includes Firmness, Health, Coolness, and Repose. The cephalic region, which energizes the arms, is also beneficial. Both upper and lower limbs, when stimulated by the hands, by hot applications, or stimulating plasters, divert from the lungs and relieve their congestions and irritations on the same principle as hæmastasis. The most prompt and effective method of relieving any congestion of the lungs is to retain a large amount of blood in the limbs by ligatures at the thighs and shoulders, tight enough to check the return of venous blood, but not to hinder the entrance of the arterial. It is more efficient than the greater part of the medical

treatment which has been in vogue, but has been signally neglected by the medical profession. Hæmastasis is more effective when following evacuations by the kidneys and bowels, reducing the volume of the blood, and when the limbs are kept warm.

15. To rouse the diaphragm for forced respiration in asphyxia or drowning, it is necessary to use powerful stimulation. Faradic currents may be sent from the cephalic to the lumbo-sacral region or to the seat of vital force at the summit of the thigh, or preferably the reciprocal galvanic current. This I think effective for rousing the vital forces, but similar currents between the cervical or upper dorsal and the respiratory region, just below the umbilicus, are more efficient and stimulating to respiration. The current from the cervical region passes along the course of the phrenic nerve. But before such means can generally be attained, respiration may be restored by manual force. The patient being placed in a reclining position (say an angle of forty-five to sixty degrees above the horizontal) and vigorous compression applied rapidly to the abdomen and lower part of the chest by two or more persons, to expel the air, which will be brought into the lungs by the reaction when the ribs expand by their elasticity, and the bowels descend by their gravity. The reaction of the ribs may be assisted by jerking the shoulders upwards at the moment.

The continued repetition of these movements may recover from apparent death, and the recovery will be assisted by the primary current from the hypochondriac region of the body to the cephalic region of the spine, and by alternating currents across the neck and the base of the brain posteriorly, as well as the currents recommended for the diaphragm.

16. To rouse the liver, we stimulate along the sixth to the eighth vertebræ, and the corresponding ribs. It is not desirable to carry this beyond the middle of the lateral surface, as it becomes a depressing influence anteriorly. When we would rouse from a torpid state, the liver being small or contracted, we may treat on the side, but in congested, hyperemic, irritated or inflammatory conditions, the treatment should be on the back — one hand on the hepatic location and the other on Health, with dispersive passes from the hypochondriac region.

Morbid states of the liver are benefited by currents from the hypochondria (especially of the right side) toward the upper dorsal region and region of Health. The best influences are produced when currents sent into the person are passed through the person of the operator, and applied by his hand.

17. From the seventh to the twelfth dorsal vertebræ inclusive, we

stimulate the stomach and the organs immediately below it.* The gastric zone extends along the direction of the ribs, and the specific anterior location for exciting hunger, thirst, and love of stimulus, corresponding to the organ just in front of the ear, is on the abdomen below the ribs about six inches from the umbilicus, and three or four inches higher. At this locality, we may not only stimulate digestion, co-operating with the spinal location, but may *control the drunkard's thirst* by dispersive passes on the sensitive,— stimulating at the same time the power of fortitude and temperance, which are roused on the top of the shoulder. This may be achieved by electric treatment, placing the positive pole at the gastric location just mentioned, and the negative on the middle of the upper surface of the shoulder.

18. From the eighth dorsal to the last lumbar vertebræ we energize the functions of the bowels, and along the gastro-intestinal location on the abdomen we may assist in the same effect. We may use the hands, or the faradic and primary currents. Upon the spine we energize at the same time the lower limbs, but at the abdominal locations the tendency is more relaxing than invigorating. Hence, the positive pole is more appropriate to the abdomen and the negative to the spine, but alternating currents produce the most efficient abdominal action.

19. On the lumbar vertebræ, especially the lower half, we may invigorate the calorific energies, which are developed by the organ of Calorification, located on the abdomen, with the difference that the latter is more feverish and superficial in its effect and the former more substantial and wholesome, being associated with general vigor. An alternating current from the lumbar region to the seat of Calorification in front is the best calorific proceeding.

20. At the upper lumbar vertebræ we may excite the urinary organs —the kidneys being adjacent to the lumbo-dorsal junction and deriving their nerve power from the renal plexus, coming from the tenth and eleventh dorsal ganglia. The bladder may be affected through the sacral region.

21. At the lumbo-sacral junction, and about three inches below it, we may excite the sexual energies, as this region is the source of sexual functions in both sexes. The influence of the lumbo-sacral region, like the upper part of the cerebellum, tends to normal amativeness

* Dr. D. Graham, a Boston practitioner of massage according to the mechanical theory, was surprised to discover this effect from the dorsal region in a case he was treating for writer's cramp, in which he rubbed the back, from a belief that it had been injured. He says in a report of this case: "After the third massage, which included the back, he was almost faint with hunger, though he had just had dinner before coming to me. I have observed the same effect in other cases; in one a physician, from percussion alone, a few minutes on the back." He evidently had very good subjects, and could have treated them more effectually if he had understood Sarcognomy.

and love. Stronger sexual desires and exhausting excesses are prompted by the lower part of the median cerebellum, the sacral region, and the sexual organs. The influence of the sexual organs and the inguinal region is more sensitive and relaxing than tonic; illustrating the general law that anterior organs tend to debility and exhaustion. To disperse from the groin and energize the lumbo-sacral region is the general rule in disorders of the sexual organs, unless we wish to suspend all action in that region, in which case we also stimulate the cephalic regions on the spine, and region of chastity below the axilla, which is a proper treatment in hysteria — a treatment which is sedative and antaphrodisiac, producing the beneficial effects of the bromides.

22. In the treatment of paralysis, we should recollect that the upper limbs are controlled from the fifth, sixth, seventh, and eighth cervical and first dorsal vertebræ; consequently, this is the locality at which the arms are to be strengthened by stimulation with the hand, or by an electric current sent to this locality from the hypochondriac region, or by moderate faradic currents for a few minutes through this part of the spine, or between this part and the hands. Dry cupping on this part of the spine and a few inches lower gives relief to pains in the arms or convulsive affections. Irritated conditions of this part of the spine may be relieved by vigorous dispersive passes, by dry cupping, or by the positive pole sending a current toward the hands or the feet, or by currents of hot water and hot fomentations.

23. Paralytic affections of the lower limbs involve the whole region from the dorsal vertebræ to the end of the spine, and require treatment by the hand and by primary and faradic currents on the entire space — on the lumbar region for the thighs and the sacral region for the legs. Moderate currents to the spine for five, ten, or fifteen minutes are beneficial generally in paralysis. Galvanism and the magneto-galvanic or primary current are the proper excitants for paralyzed nerves; and the alternation of currents is beneficial. The negative pole too long applied has a congestive and solvent or softening influence, which may be counteracted by the positive. After the negative pole has stimulated the cord and its circulation sufficiently, the positive pole on the spine may be used to send some of the accumulated energy into the limbs. In stimulating the spine with the negative pole it is not necessary that the positive pole should be placed on the limbs; on the contrary, a better effect may often be produced by placing the positive pole on the opposite anterior surfaces of the body — as a backward-going current is always tonic and invigorating. The upward current develops the spinal cord at the expense of the limbs. As a general method, I would recommend a

current from the frontal surfaces of the trunk to the spine, followed by reciprocal or alternating galvanic and primary currents between the spine and the limbs. If the operator has not a commutator, which is the best means of producing alternate currents, he can change the position of the electrodes, or shift their connections with the battery; but the rapid reciprocal current automatically produced is the most efficient treatment. A moderate faradic current between the spine and the limbs is suitable for their invigoration, but not so appropriate *while the paralytic condition continues,* which is benefited chiefly by the galvanic or primary current. Local faradism upon the muscles helps to stimulate their growth and development. The reciprocating galvanic current automatically produced by a commutator is one of the most important applications of electricity, but one which has been greatly neglected. The commutator is the most efficient method of producing the uniform electric stimulation without different polarities in the electrodes and without any of the corroding chemical action of the current; hence more pleasant as well as more effectual.

24. In treating the various portions of the spinal cord for their constitutional effects, there are six different methods.

First. Vital manual treatment, by touch and gentle percussion to stimulate, and by dispersive passes with the hand, for removing morbid conditions. Moderate friction with the hand serves also for stimulation. Some sensitives are favorably affected by breathing upon the part to be treated.

Second. Galvanic currents are stimulant by the negative, and sedative, but tonic, by the positive pole.

Third. Faradic currents are strongly stimulant, and should be used with moderation either on the spine, or on the spine and the affected organ, or on the muscles, or, for local action, on the dry skin, which hinders the current from passing inwards. The current should be moderated by using large sponges or broad carbon plates as electrodes, and weak currents when the electrodes are near together. The carbon plate electrode, with a wet cloth on its surface, ought to supersede the metallic electrodes in common use.

Fourth. Mechanical treatment may be used by dry cupping to remove irritation and pain; by hot water for a very short time, for its sedative and soothing effects; by cold water or ice for a similar purpose, which must be continued for a longer time to prevent reaction, and which requires more caution in its use. The rubber bag of hot water or of ice is a very valuable application.

Fifth. Stimulant and tonic plasters are a valuable adjunct in spinal treatment, and may be made more efficient by combining them

with suitable remedies or by applying the remedies on the spine and covering them with the plaster. The California Laurel, a new remedy, the value of which is not known to the profession, is one of the most efficient of all agents for restoring spinal energy, especially in paralytic conditions. Scutellaria combines with its soothing properties a restorative influence on the lower half of the spine. Almost any medicine may be applied on the spine in the form of an embrocation or an ointment.

Sixth. Counter-irritation on the spine, when obstinate chronic difficulties resist all other measures, is effected by mustard plasters, cantharides, ammonia, and concentrated acetic acid — also by moxa and the momentary application of the hot metallic button, heated to the temperature of boiling water, for the removal of pain. One of the most powerful of all counter-irritants, for the removal of morbid conditions, is the compound tar-plaster, or irritating plaster of the Eclectic Dispensatory; its effect is slow and very unpleasant, but efficient. Conditions less chronic are met by dry cupping.

25. Paralysis due to the brain affects that side of the body which is opposite the cerebral hemisphere that is affected. Hence it requires treatment on the brain where the cause (softening or hemorrhage) is located. Treated by the hand it requires a strong operator, and he should stimulate the cephalic regions on the spine and under the axilla, also the superior posterior or hygienic region of the head, using at the same time dispersive upward passes from the cheeks and under jaw to the crown of the head. Downward manipulations on the back of the neck and along the jugular veins will be very beneficial. The site of the hemorrhage will probably be at the base of the middle lobe, near the upper frontal line of the ear. Hence dispersive downward passes on that region will tend to promote absorption and check any irritation or inflammation. Manual treatment is safe, and after a week from the attack a mild galvanic current through large carbon electrodes or sponges might be passed through the affected hemisphere to the opposite hand or shoulder blade, or the cephalic region of the spine, to disperse morbid conditions. Faradism should not be used in such cases. The hand should be applied to the occipital base, where it covers the cerebellum, and to the hygienic region at the same time, but we should avoid exciting any part of the regions anterior to the ears. Treatment of the spine in these cases, by manipulation and percussion, is a beneficial auxiliary to the brain treatment. Nervauric and electric treatment are appropriate in all cases of paralysis, and the best results are produced when the operator administers the positive current through his own hands, thus combining the nervauric and electric powers.

CHAPTER VII.

RELATION OF THE BRAIN TO VITALITY IN ITS DIFFERENT REGIONS.

Division of the brain by the vertical and horizontal lines — Rational illustration — Plan of the human constitution, front and back, above and below the ventricles — Fundamental law of direction — Action of basilar organs — Their effect on the body — Coronal organs antagonistic to the basilar — Effects of each — How the paralysis of either becomes fatal — Superior vitality of the upper surface of the brain — Anterior and posterior basilar organs — Seats of vital force at the base of the brain — The anterior basilar region and its subdivisions — The gastric region — Seat of appetite — The love of stimulus, effect of its development — How to control intemperance — Medical remedies — The moral and religious cure — Effects of malaria and of animal food — Treatment of the digestive organs through the brain — General character of the antero-basilar region — Calorification, how to excite it; how to protect it — Effect of its overaction — The respiratory region — Signs of pulmonic disease in the mouth — Region of Sensibility — Its confirmation by Ferrier — The organ of Language — Heating and cooling the temples — Region of Somnolence and its mental phenomena — Anterior coronal region — Temporal region.

THE brain may be divided by a vertical line through the ear and a horizontal line running back from the middle of the forehead.

The vertical line separates the occipital from the frontal half, leaving the impelling forces in the occipital half, which constitute physical and moral power, by which we succeed and conquer, while the frontal half contains the physical, moral, and intellectual sensibilities, which yield to the mental influence of others and the influence of physical objects, obstacles, and injuries. The *predominance* of the frontal results in physical and moral weakness, amiability, and refinement, without power to resist disease, exposure, or hostility. The occipital makes the positive, and the frontal the negative character — one the leader, the other the follower. The occipital character was illustrated in the crania and martial career of the New Zealanders (an equal match for European troops) and the frontal in the gentle, harmless Peruvians — victims of Spanish slaughter. The New Zealand crania are as remarkable for occipital development as the Peruvians are for occipital deficiency and frontal predominance.

The general plan of the human constitution places power in the rear and sensibility in front. The senses are exercised in front, and the maximum degree of sensibility is at the epigastrium, where a severe blow may give a fatal shock. The skin in front is more sensitive than at the back, and the muscles in front respond more readily

to electrical excitement. The muscles of the face and front of the neck are very sensitive to electric excitement; the muscles of the back are relatively much less sensitive, and the muscles of the posterior aspect of the upper and lower limbs are less sensitive than those of the anterior and inner aspect. Beard and Rockwell say of the head: "In health the head is very sensitive both to galvanization and to faradization, in all parts except the posterior. In health the spine is but little sensitive to the current."

The horizontal line divides the regions of the brain (below the great ventricles) which are in close communication with the body (by the ramifications of the ascending fibres of the spinal cord, outspread in the crura, thalami, striata and cerebellum) from the regions above the ventricles, which are not in close communication with the body, but are directly connected with each other, and unitized by the great commissure, the corpus callosum, which connects the right and left halves or hemispheres.

The fundamental law of cerebral action (which will be fully developed in the volume devoted to Pathognomy) is that all organs act in accordance with their line of direction. The basilar organs (below the ventricles) act upon the body, impelling all its vital energies and voluntary actions, and by this action they expend the cerebral energies, producing exhausting and destructive effects. Hence their tendency *per se* is not healthy and beneficial in a physiological sense, while morally they produce the unbridled sensuality, selfishness, and restless violence which, in predominance, are criminal and degrading. Their influence is beneficial only when acting harmoniously in conjunction with the higher powers. The passions and appetites are essential in their subordinate places, but fatal as rulers, being alike ruinous by their exhaustive violence, their sensual excess, their incessant agitation, and their hostile relations to our fellow-beings and to all supernal influences.

Nevertheless, the basilar organs have been regarded as the seat of animal life, and surgeons have found injuries of the brain more fatal in proportion as they are located further back from the forehead to the base of the occiput. The reason of this is that the basilar organs are the organs of manifestation of soul life in the body, without which all power of manifesting life and volition would be lost. The muscles would cease to contract, the heart to beat, the lungs to respire. The tendency of the coronal organs *per se* is to withdraw life from the body to the spirit, the immediate effect being self-control and tranquillity, and ultimate effect, in abnormal excess, trance and death of the body, but their normal action sustains the activity of the brain and the power of vitality.

Injuries to the basilar organs are fatal because they sever the connection of soul and body by depriving the body of that influx of energy which comes from the brain, thus suspending every physiological process. The suspension of digestion terminates life in a few weeks by taking away the material necessary to the blood and the structure of the organs; the suspension of circulation terminates it in a few hours, or perhaps in a few minutes, by suspending the influence of oxygenated blood; and the suspension of respiration terminates life in a few minutes.

The isolation, paralysis, or destruction of the basilar forces suspends all these processes, and thus arrests life in the body, but leaves it perfect in the soul as it separates from the body. For the same reasons injuries to the base of the skull are peculiarly dangerous. Dr. T. H. Manly, an experienced New York surgeon, says of fractures of the skull: "When we are reasonably assured that the base of the skull is involved, death is inevitable, and treatment is out of the question." "Next to the base of the skull, probably a fracture through the temporal bone is the most fatal."—[Dr. T. H. Manly, surgeon to Harlem Hospital.

Thus the action of either the coronal or the basilar region of the brain alone, while the opposite region is more or less paralyzed, is fatal. The impairment of the upper region of the brain leaves the animal forces, passions, and sensibilities in riotous excess, without sustaining power, resulting in disease, exhaustion, insanity, and death. Disease or softening of the superior organs of the brain is fatal in another way which has been amply illustrated by the records of pathology: it impairs the vitality of the brain and thus tends to paralysis, disease, and death. The cephalic or superior region sustains the brain and thereby sustains life.

As the superior region of the brain is the source of beneficent influences that elevate the character and sustain the nervous system, its emanations are therefore the most beneficent that proceed from any portion of the body, and the upper surface of the head is far more effective than the hand in conveying hygienic benefits to others by direct application. Its influence is always soothing and delightful. That influence is consequently realized by the scalp, which is naturally a healthy region, and rapidly recovers from injuries. Dr. T. H. Manly, surgeon at Harlem Hospital, N. Y., says that "scalp tissue is very prone to heal; when there is no septic infection, *more quickly than any other in the body.* I once saw this well illustrated in a lunatic, who, when alone, first by pounding his forehead against the edge of an iron sink, detached the scalp anteriorly from ear to ear, and then tore the whole down over the back of his neck, before discov-

ered, when he was very faint from loss of blood. The parts were promptly replaced, and he made a good recovery." Though the head contains organs vital to life, it will stand battering and bruising with greater impunity than any other part of the body."

The loss or exhaustion of the basilar region while the upper region is active, leaves the soul in full development, but unable to act upon and vitalize the body, the death of which must follow, the brain being impaired by the lack of healthy blood.

The cultivation of both coronal and basilar regions is therefore necessary, and as the physician is mainly occupied in restoring the bodily organs which have lost their vigor or their texture, he is required to sustain the higher organs, which are the source of brain power, and also to invigorate the basilar organs. The latter is a large part of the duty of the nervauric healer, and he is frequently required to place his hands on base of the brain behind the ears, to supply the amount of vital power which the enfeebled brain has ceased to yield. In doing this a correct knowledge of cerebral organology is highly important.

The basilar region, like the coronal, is divided by the vertical line through the ears into anterior and posterior regions — the posterior being the region of vigor and the anterior of sensitive impressibility.* Hence the application of the hands to the base is chiefly made on the posterior region. This produces an increase of life, strength, circulation, and nutrition throughout the person. The comfortable warmth, the increased strength, and the gradual improvement of every function make this a very agreeable operation to the patient. In those who are extremely impressible, the basilar excitement may go too far and stimulate restlessness, or the violent passions, but this seldom occurs with patients, and is counteracted by the operator's presence and the diffusive influence of his vitality. The posterior basilar co-operate with the posterior superior organs, and the anterior basilar with the anterior superior organs of the amiable sentiments. Hence the amiable sentiments tend to sensitive weakness and the heroic impulses to violence.

The vital force sustaining the muscular system is specifically reached at the organ of Vital Force, at the base of the skull, half-way between the mastoid processes (just behind the ears) and the median line. On the median line, in the depression extending two inches below the occipital knob, we stimulate a vitality which has more influence on the nervous than the muscular system, which invigorates

* To this remark there is an exception at the lower part of the face, from the nose to the bottom of the chin — the regions of Respiration and Calorification, — the prominence of which is an indication of a vigorous temperament. The organs which this region represents are rather behind than before the middle of the base.

the senses and the sexual system, and is especially beneficial to the eyes. To apply the fingers of one hand at this spot, and the fingers of the other across the brow immediately over the eyes, overcomes weakness of the eyes and resists their diseases. (The reader will understand, of course, that such remarks apply to the impressible temperament.)

I do not propose to give a full statement of the physiological organology of the brain at present, but merely to give certain localities easily learned, and often used in nervauric treatment, through the head.

The anterior basilar region (antagonistic to the upper occipital) has many localities that should be understood. Immediately before the cavity of the ear is the region of the gastric appetites (marked on the phrenological busts as the organ of Alimentiveness, and erroneously extended above the zygoma or cheek-bone), corresponding to the place where the upper end of the jawbone works in its glenoid cavity. The stimulation of this locality excites a feeling of hunger, which becomes at length debilitating if not satisfied, but its stimulation, when the stomach is occupied by undigested food, relieves the oppression more than a dose of pepsin, and even relieves flatulence. We sometimes hear the effect in a few moments. In my early experiments in 1841, the subject, Mr. V., was made hungry enough to begin eating a tallow candle.

The intensity of hunger, however, is not always proportional to the desire or demand for food. The demand is sometimes eager when the depressing effect of hunger is not felt, and the depressing effect is sometimes great when the attraction or impulse to take food is small. Hence if we would invigorate the stomach most effectively, it may be necessary to stimulate the posterior basilar region also, which gives the impulses and desires. What I have been teaching in this respect has been strongly corroborated by the experiments of Ferrier on the brains of monkeys. "After removal or disorganization of the occipital lobes, the appetite for food is abolished" (says Ferrier), "the animals refusing that which they formerly exhibited a great liking for. This I have tested in various animals and various ways."

The posterior portion of the Gastric or Alimentive organ, immediately at the cavity of the ear, is the portion which makes the drunkard when it controls, and which originates the craving for stimulants in common use, such as tea and coffee, mustard, spices, etc. When I stimulate my patients in this region they desire a stimulus stronger in proportion to the excitement, until even a delicate lady of temperate habits will delight in the strongest brandy or whiskey. The

depressing influence of this organ is counterbalanced by the stimulus taken, which restores equilibrium and does not intoxicate unless it exceeds the natural demand. Hence old topers show no intoxication after taking their half-pint of alcoholic liquids, for the same reason that the man depressed by the bite of a rattlesnake shows no stimulation after taking a pint of whiskey. But persons in whom this organ is small, or who are ruled by a great preponderance of the coronal region, are easily intoxicated, and this class are most rapidly destroyed by intemperance. When one is already under the influence of alcoholic liquids, the organ of Love of Stimulus should be excited to promote sobriety, by counteracting the intoxication, for the same reason that we excite the gastric organ when overloaded with food.

To counteract the habit of intemperance, the opposite region of the brain, which is a region of temperance, cheerfulness, and fortitude, should be stimulated. In the impressible subject this may be done by the hand, and the stimulus of this region destroys the appetite for alcoholic stimulation. If this be done by any method which effectually rouses the higher moral sentiments, intemperance will be conquered; and this has been done extensively in the inebriate asylums of New York and Philadelphia, which rely upon religious influence.

Tonic medicines necessarily overcome this depression and rouse the moral and physical energies, taking away the appetite which originates the desire. *Hydrastis* is one of the most efficient and wholesome tonics for this purpose, and when I recommended it forty years ago I heard favorable reports of its effects from my pupils. Quassia has also been successfully used; so have the sulphate of cinchona, strychnia, and some preparations of gold, all of which are powerful tonics. *Berberis vulgaris* (the barberry) is also an excellent tonic for this purpose, and very wholesome. Balmony and cypripedium may also be used with benefit, and coca is also useful in sustaining the nervous system.

As the drunkard's thirst is dependent on the basilar region, and controlled by the coronal, it seldom appears among women, and it is very effectively resisted by religious influence. The restoration of drunkards in religious asylums in New York and Philadelphia has been marvellous, and as intemperance is associated with the basilar organs, its effective conquest can be made only by cultivating the moral nature. As long as men indulge the violent and selfish passions they will have the corresponding appetites. Moral education alone can abolish intemperance. A healthful atmosphere contributes to temperance as a malarious one contributes to intemper-

ance. Animal food, which stimulates the base of the brain, favors intemperance, while a vegetarian diet, and especially the use of fruit, has the opposite effect.

The stomach and bowels may be treated through the brain, the gastric and abdominal tract being located along the course of the lower jaw, *i. e.*, we reach the organs through this external locality. But in overcoming dyspepsia, constipation, etc., I prefer the treatment on the body according to the principles of Sarcognomy, although the head treatment is highly beneficial when the impressibility is marked.

The general character of the antero-basilar region, as already stated, is sensibility to impressions or experiments, and a tendency to nervous expenditure of vital force. This sensitive excitability is antagonistic to the vital power, and renders us so susceptible of painful, exhausting, overpowering impressions as to become the great inlet of disease. Extreme sensibility cannot exist without extreme liability to injury. Hence the anterior inferior region is the region of morbid capacities, and requires to be overbalanced by the occipital half of the brain to make a strong and hardy constitution.

But this region is not *necessarily* morbid. It gives immense capacity for enjoyment by the physical and mental sensibilities, and if no injurious impression is made its action is healthful, though sensual and relaxing; but no one can pass through life without encountering many injurious influences, physical and moral, and realizing his capacities for disorder of body and mind. Irregularities of climate, exposure, malaria, unsuitable food, excess or privation, anxiety, anger, disappointment, etc., are inevitable, and can be overcome only by the occipital energies. Hence we perceive that the habitual indulgence in luxury and sensual pleasure undermines the constitution and lays the foundation of disease.

The morbid tendency of the antero-basilar region culminates at the anterior end of the middle lobe — against the sphenoid bone, behind the malar bone, which gives prominence to the cheeks below and behind the eyes. This is the locality of that irritable sensibility which is easily injured, and gives the greatest liability to disease; and as its excessive action results in disease, it is marked "Disease," and its stimulation to any great extent is debilitating and injurious. Hence the bracing effect of the cool breeze striking the face, and of manipulations in which the fingers pass rapidly and lightly backward and upward over this region toward the crown of the head — the method generally adopted in relieving debilitated and oppressed conditions. Passes made in the opposite direction are quieting, relaxing, debilitating, and somewhat soporific; sponging the cheeks and

temples with warm or hot water has a beneficial effect in feverish, excitable, nervous, or depressed conditions.

There is a lower grade of vitality in structures adjacent to the sensitive anterior base of the middle lobe and the corresponding location of the body, the hypochondria especially. Hence the diaphragm and the tongue are the first muscles after death to lose their electric contractility, and next come the muscles of the face. For the same reason diseases in the throat, such as diphtheria, have a very prostrating influence over the whole constitution.

The region of the anterior base, which we reach below the jaws, has the same relation to the mental as that at the cheek-bones to the physical health. It gives that degree of excitability which is easily exhausted and easily excited to frenzy.

Hence it produces liabilities to melancholy, idiocy, and mania, the excitement running beyond the control of the will, and becoming injurious to the brain and the mind. The idiotic tendency is located anteriorly, the violent posteriorly, and the melancholic superiorly and on the jaw. The position of the insane region is in the interior portion of the base of the brain, near the median line.

The location of the insane and morbid tendencies at the base of the middle lobe is probably the reason that the morbid conditions of the brain substance are more frequently found there than in any other part.

A temporary dementia or mania is easily produced in impressible subjects by stimulating the insane region. Conditions of mental depression and disorder are relieved by dispersive manipulations, upward and backward, over this region, or downward to the shoulders. The downward manipulation is effective in clearing the frontal brain. The brain being supplied by two great arteries and veins, the carotids and jugulars, at the side of the neck, and the vertebral arteries and veins at the back, its circulation is promptly affected by downward manipulations on the side and back of the neck, which tend to carry off venous and introduce arterial blood.

Hence I usually begin the treatment of headache by downward manipulations on the back of the neck, followed by similar manipulations on the side, and by dispersive passes, generally backward, on the spot where the pain is located.

The upper posterior region, including the crown of the head, extending from right to the left posterior angle of the parietal bone (marked on the old phrenological busts as Cautiousness), is the region antagonistic to disease and insanity, where the application of the hand produces the most beneficial and restorative effects on body and mind.

Through the chin we operate on the medulla oblongata and stimulate the production of heat. Hence this locality is marked Calorification.

We know by Chossat's experiments in vivisection that the production of heat in the body depends upon the transmission of innervation, downwards from the brain, through the spinal cord to the ganglionic nerves of the abdomen.

When we place one hand around the chin, and the other around the occipital base, the circulation and evolution of heat are at once increased and directed downwards. Thus we warm the lower limbs and break up chills.

The calorific power being thus located, enables us to understand why a little woollen clothing around the chin and neck is more protective to our warmth than five times the amount elsewhere. When this region is left unprotected, and cold penetrates the base of the brain, the power of resistance is thus overcome, and sleep follows which ends in death. Calorification is one of the exciting and wakeful faculties. Hence the cold weather which stimulates our heat-forming power gives greater clearness and wakeful energy to the mind, and hot weather, which diminishes calorification, promotes drowsiness. The hottest part of the day is given to the siesta in warm climates. For the same reason, whenever intense cold penetrates the base of the brain and diminihess calorification, the drowsy influence is felt, which is a dangerous condition, as it shows that the power of resistance to cold is disappearing.

The overaction of Calorification in mental ardor, excitement, and fever is exhausting, like that of all other antero-basilar organs, whenever it is more than sufficient to counteract the effects of external cold and exalts the temperature of the body. For the same reason hot climates produce a more excitable and less energetic or enduring constitution, the effect of heat being to stimulate the anterior sensitive region of the brain, developing more delicacy and refinement than strength.

If the hand, in covering the chin, extends up and around the mouth the effect is seen in increased respiration.

The external indications of the respiratory tract are around the mouth and nose, through which respiration occurs. Prominence of this region is a sign of greater respiratory power. The portion just below the mouth is indicative of deep respiration, and is associated with greater force of impulse and violence in coughing. The sympathy of the lungs with this region is shown by many facts — such as the brick-red line along the front teeth and gums which is developed in pneumonia, and the facility with which some persons catch cold after shaving around the mouth. I have been told by some that they wear their beards rather than shave, for the sake of this protection.

The application of the hands on the respiratory region stimulates

the lungs and the respiratory processes. Applied just below the mouth they excite depth of respiration. The depth of respiration is usually increased in exciting Calorification.

The antero-basilar region also contains, just above Disease, the organ of Sensibility, which gives power of sensation to the opposite side of the body, according to the law of decussation which governs the brain in its connection with the body.

The region of Sensibility connects anteriorly with the organ of Language, discovered by Dr. Gall and confirmed by the observations of pathologists, who neglected his discovery until confirmed by numerous dissections of morbid brains.

My own discovery of the organ of Sensibility fifty years ago has been confirmed by the cruel experiment of Dr. Ferrier upon a monkey, in which, by injuring the base of the middle lobe, he destroyed the sense of feeling on the opposite side. The location in the monkey, however, appeared to be a little farther back than in man.

The close connection of Sensibility and Language in the brain with the source of voluntary muscular action in the *corpora striata* explains the association of the paralyses of motion, sensibility, and language — paralytics often losing the power of speech or command of language.

Dispersive passes upward and backward over the temples not only relieve morbid conditions, but diminish sensitiveness and tend to remove pain. They are especially beneficial in morbid conditions of the eyes and intolerance of light. Heat and excitement accumulated in this region produce a great increase of sensibility and impressibility, and sometimes develop the mesmeric somnambulism.

The tendency to dreamy, somnolent conditions, somnambulism, somniloquence, and clairvoyant trance is connected with the locality about an inch behind the brow, marked Somnolence, by touching which a few minutes in the impressible we cause the quivering and closing of the eyelids which precedes a dreamy sleep or clairvoyant trance. This is a good method of inviting the approach of sleep or of making intellectual experiments on the intellectual powers and sympathies developed in that condition, in which psychometric perception and intuition, trance, and even clairvoyance may occur.

In the upper half of the brain, the anterior portion antagonizes the occipito-basilar region, producing a gentle, harmless, unselfish nature, and moderating the violence of the passions and vehemence of the desires. In nervauric treatment, this region is chiefly useful for soothing purposes, brightening the intellect, elevating the sentiments, and promoting contentment, or improving the moral nature and friendly sentiments.

The lateral portion, along the temporal arch, is the proper location for placing the hands to subdue restlessness, loquacity, and sexual impulses. The most posterior portion of the arch, vertically above the ear, is the location for resisting insane and hysterical conditions — the region marked Sanity.

There is a remarkable coincidence and similarity between the organs on the median line and those located on a parallel line, beginning at the external angle of the brow, and running along the ridge between the lateral and superior surfaces of the cranium. Hence breadth of the upper surface of the brain compensates for the lack of height.

The lateral aspect of each hemisphere corresponds in character and coincides in action with the lateral aspect of the other hemisphere, which looks in the same direction — the right coinciding with the right and the left with the left. Thus the interior or median aspect of one hemisphere coincides with the exterior aspect of the other, and this parallelism or similarity assists us in the study of the median convolutions.

CHAPTER VIII.

ZONAL ARRANGEMENT AND THERAPEUTIC TREATMENT OF THE BRAIN.

Explanation of Zonal Arrangement, with illustrations — Its indications of constitutional development — General law of functions — Vertical Zone of Excitability — Treatment on the cephalic region — Treatment of the heart — Of the thoracic region and of the liver — The Gastric and Abdominal region, and the Crural — The Morbid Zone explained — Hygienic caution, and curious illustrations — Relation of disease to the brain — Treatment of the Crural region — The Sexual region — Treatment of special functions — Health and disease — Sleep and wakefulness — The ideal powers — General vigor — Feverish conditions — Mental soundness — Warmth — Mental discipline — Nature of nervauric treatment.

THE zonal arrangement of the brain is a necessary consequence of the laws of Pathognomy. Our review of the spinal system shows that as the organs of the body occupy successive zones, their controlling centres in the spinal system are necessarily in similar successive order, viz., the cephalic, pulmonic, cardiac, hepatic, gastric, abdominal, pelvic, and crural — the lumbar and sacral regions being at the same time abdominal, pelvic, and crural, as the superior region is at the same time cephalic, brachial, and thoracic — the internal visceral organs being associated with the external muscular, in the spinal functions, and a similar arrangement being apparent in the brain — the visceral and the energetic faculties being on the same plane or in the same zone — as in the spinal column they occupy the same segments.

The arrangement is so clearly exhibited on the map that we need only to grow familiar with the locations to understand their treatment, guided by certain general principles.

Each cerebral zone indicated on the map tends to direct the vital forces according to its name, and gives prominence to the region it represents. This is its direct physiological influence on the constitution.

But aside from this direct physiological influence, each cerebral locality has its psychic function, and this psychic function compels the same physiological action which is promoted by its direct influence; and this wonderful combination of psychic and physiological influences, by a perfect but simple and intelligible law, is one of the grandest illustrations of divine wisdom.

To illustrate this remark, all the functions of the organs in the *cephalic* zone are of a cephalic tendency. They increase the vitality and power of the brain by the exercise of their functions (such as Spirituality, Religion, Integrity, Love, Hope, Serenity, Fortitude, Energy, Health, Sublimity, Tranquillity, Sanity, Heroism, Dignity, Firmness, and Moral Ambition) and consequently produce a more perfect and active life. In the *Gastric* and *Abdominal* zones we have the selfish, restless, violent, and gloomy passions, which stimulate the appetites and promote intemperate indulgence, while they rouse all the muscular energy of the lower limbs. Thus do the psychic faculties concur with the physiological organs they stimulate through the brain. The unity and harmony of the human constitution are nowhere more clearly perceived than when we study the psychic powers in all their phenomena, and trace their effects on the constitution. But this is a vast study, which can be illustrated only in the volume of Anthropology.

To comprehend the zonal arrangements for therapeutic purposes, we need only apply the general laws of cerebral science — understanding that each zone uses and stimulates its own region of the body. We may examine the development of the head, to see what organs predominate in the constitution or which are deficient. Thus if the head be very broad and high at the cephalic zone and very small in the crural, we know that animal life and muscular energies are below par, and that the predominant action of the brain in its upper and anterior regions may diminish still more the basilar energy. Hence, there is probably a failure in the muscular energy and in the nutrition. The body is apt to be imperfectly developed or lean, and the muscular powers weak, though the nervous energies may be strong. On the contrary, when the crural region is large we have a robust physical development, muscular energy, and in some cases stoutness or corpulence. If the cephalic region be *proportionally* small or imperfectly developed — there is less mental and moral control, and a greater tendency to exhaustion of the nervous system and all forms of nervous disorder, as well as moral irregularities.

If the Gastric and Abdominal zones are defective in development, there will probably be great feebleness or inactivity in the digestive organs — with appetites feeble and easily controlled, and constitutional temperance.

If there be great narrowness or lack of development at the Hepatic zone, the liver will be found inactive, and torpor of the liver is a probable consequence.

If the Cardiac zone be largely developed we shall have a strong circulation with the consequent excitability and energy of temperament,

and a greater passional energy than is desirable, which will be absent when the Cardiac zone is moderate.

If the Thoracic zone be large, it will give the temperament a brightness and activity, less restless and turbulent than that which comes from the lower organs, but less calm and self-controlled than the cephalic temperament. A deep cerebellum and full development at the cephalic region of the spine or across the shoulders, would indicate great and sustained muscular strength.

These remarks are not sufficient to guide one in a physiological examination which requires a knowledge of all the organs, but will serve to explain the significance of the zones. The subject is so complicated as to require a complete exposition of the brain for its proper understanding, but an approximate conception may be realized by dividing the occiput into three regions, corresponding to the upper dorsal, the lower dorsal, and the lumbar and sacral regions of the spinal column. Each of these regions has its correlative and co-operative region before it, which it sustains in action. (See pages 76 and 159.)

The general law of the brain is that organs have a more refined, delicate, intellectual character as they approach the front, and a more energetic, reactive character toward the back; also that they have a more refined, lovely, pleasing, spiritual character as they ascend, and a more gross, selfish, repulsive, and violent character as they descend.

Hence, when we look at the zones, we find the energy of each organ indicated by the posterior, and the delicacy by the anterior part of the zone; while on the side of the head, between the front and back, there is an excitability which gives activity without permanent power, and in front there is a capacity for manifestation that only exhausts, and requires to be compensated by the repose of sleep.

Looking along the side head, from the ear up, we easily recognize the excitable activity of each organ, but we must look further back for its vital force. Thus along the whole side of the head and body we have a longitudinal and vertical segment of excitability for all the organs, intermediate between the exhaustive delicacy of the front and the enduring power of the back, upon which latter, as already stated, the curative processes of nervauric healing are chiefly effective, and to which galvanic currents carry the energy that develops life and strength; as has been shown by Onimus and Legros.

There is so little physiological utility for the healer in the anterior regions, that I generally present the zonal arrangement of the head only to the line of activity or excitability, without carrying forward the zones to the regions of exhaustion, of which the most complete and pernicious is at the anterior end of the middle lobe, at which we locate the organ of Disease.

When the nervauric physician would treat the brain he applies his hands upon each of these zones to invigorate corresponding organs, as he might, if he had control of circumstances, invigorate them by the exercise of the organs in the natural way; for example, he might invigorate the heart, not by stimulating with the hands the cardiac regions of physical courage, but by placing the patient in a position which would require the exercise of physical courage. He might invigorate the refined action of the brain, not by placing his hands on the region of Reverence and Sublimity, but by placing him in grand scenery or cathedral scenes which would rouse those faculties.

I present the zonal treatment of the constitution through the brain as an important adjunct to healing on the body, but not as a *complete* statement of cephalic healing, which requires minute knowledge of the cerebral organs, nor as an exact exposition of Anthropology.

Proceeding upon the proposition that energy is a posterior quality — a quality of the occiput,— the healer would place his hands on the anterior part of the cephalic zone, above and a trifle in front of the ear, when he wishes to give a stimulus to cerebral activity without calling forth its strongest capacity. The calm, emotional thought thus elicited at Reverence, Sublimity, and Tranquillity is a pleasant condition, but is not the strongest display of brain power. Moving his hands further back, he elicits the influence of Sanity, which is closely analogous to that of Firmness. This faculty gives a strength of mind and stability of brain, tenacity of will and power of concentration which resist all the exciting, depressing, and deranging influences from which insanity comes. Magnanimity, a little further back, gives still greater positive strength of mind, and from these two organs across to the median line we find still more active sources of cerebral power in Cheerfulness, Energy, Heroism, Firmness, Sense of Honor, Approbativeness, Oratory, Ambition, Self-Sufficiency, Dignity, and Self-Reliance or Self-Confidence.

Under the influence of these organs he is not a passive, calm thinker or listener, but feels a disposition and has the power to impress others with his own thoughts, and thinks with an energy and brilliance which is impressive.

As in the cephalic zone, so in each zone activity is frontal and power occipital. Each organ of the body may be roused by its cerebral zone; and hence the entire occipital region furnishes a rousing energy for the whole person, whether stimulated by the nervauric hand or by the natural circumstances that rouse our energy, ambition, courage, passions, and appetites.

When the healer is familiar with the zones, he has a simple task in cerebral treatment to give the organs excitement or stimulation, if

torpid, through the lateral section, the vertical zone of excitability, and to reinforce them, if lacking in power, by the occipital portion of their zone.

The *heart*, for example, may be roused by the excitability in the vertical zone, just in front of the ear (Cardiac zone); but it is very seldom indeed that any such excitement is desirable. The increased rapidity and force of its action produced in that way is like that produced by alarming or exciting scenes or dangers, and would, as a general rule, be quite exhausting if carried far. But the increased vigor of action produced in the occipital part of the zone by Business Energy, Adhesiveness, Aggressiveness, Combativeness, and Love of Power, is not of that exhausting character, and, if not carried to excess, would be very beneficial in a debilitated state of the heart, which is very common — a state of dilation in which it is expanded and its muscular coat thinned (especially on the right side),— a condition especially frequent among females, and recognized by the sonorous action of the heart, its beats being heard throughout the chest and distinctly recognized at the back.

The best locality for cardiac stimulation is not Combativeness, which is too exciting or forcible, and extends below the cardiac zone proper, but posterior to Adhesiveness in the organs of Business Energy and Oratory. This corresponds with the cardiac location on the spinal column, and if the two localities were simultaneously excited the effect would be enhanced.*

The region of cardiac excitability sometimes needs tranquillizing, and its antagonist is the region of Firmness, which gives stability and tranquil regularity. The organ of Health gives the same stability, with a little more of agreeable activity. These localities should be firmly fixed in the mind of the physician — Firmness on the median line vertically above the cavity of the ear, and running back about two inches to the organ of Dignity; Health, parallel to Dignity, midway between the median line and temporal arch (which forms the ridge between the lateral and superior surfaces of the head).

The organ of Calorification, reached through the chin, co-operates with that of cardiac excitability, and adds to the rapidity of the heart's action (which is illustrated in fever), and consequently the organ of Coolness, in the thoracic zone (on the middle of the side head immediately behind a vertical line from the posterior portion of the ear) is one of sustaining and strengthening influences for the

* It was by these and the anterior organs that I controlled the pulse of Dr. Lane before a committee of Boston physicians in 1843, and produced an enfeebled action of the heart similar to a low stage of fever, as described by Dr. Flint and reported by Dr. Bowditch, when I excited organs anterior to the ear.

heart. In a case of pericarditis, or any inflammatory affection of the heart, we need the influences of Firmness, Health, and Coolness, with dispersive passes by the hands or the sponge of warm water (or hot water) on the cheek and temples, passing over Disease and Cardiac Excitability backward and upward.* In angina pectoris we should place our hand on the middle of the dorsal region, and with the other make dispersive passes upward and backward over the heart, and especially over the region of Cardiac Excitability on the body, below and behind the nipple.

The Thoracic region at the temples produces a nervous and sanguineous determination to the lungs, prompting expansion by the ribs, or costal inspiration. This inspiration, as a physical act, promotes spiritual inspiration, which will be found in those who have a full development along the line from pulmonic excitability to the external angle of the brow.

In dry, asthmatic, or constricted conditions of the lungs this pulmonic excitement may be beneficial, but it would be objectionable in pneumonia, or any inflammatory irritation in the chest, in which we need the invigorating influence of the pulmonic energy at the back part of the pulmonic zone of the brain, one and a half inches from the median line, where we find the same influence as on the back between the shoulders for four or five inches below the neck, the best locality for the invigoration of the lungs. But all severe irritations or inflammations of the lungs are best treated by tranquillizing derivation — by stimulating the anterior tibial surface of the leg.

The Thoracic region on the side head assumes a more exciting character as it descends, and rouses the heart and lower portion of the lungs; passing then into the Phrenic zone it rouses the diaphragm and developes a more extensive and exciting respiration. Hence we may say that the entire side head below the Cephalic zone tends to increase the activity of respiration — the lower portion increasing its depth by action of the diaphragm.

The *liver* may be stimulated by applying the fingers on the hepatic region, adjacent to the meatus auditorius (cavity of the ear); but in proportion as we extend our application backward on the same level, we give it a greater amount of vital energy.

The fact that the cerebral organs are the organs of psychic impulses does not modify the truth of this doctrine of therapeutic treat-

*The first important application of my discoveries to the treatment of a serious case of disease, in 1841, was in the case of a young man at Louisville, dangerously ill of pericarditis, in whom I had perfect control of the heart, through the brain, and taught his attendants to soothe the action of the heart by sponging with warm water the cardiac region on the side head, which was more effective than any medical treatment that he had received. On his recovery he ascribed his cure to the treatment I administered and directed, which was entirely through the brain.

ment, for the psychic impulses in each zone are precisely those which affect the physiological organs to which they correspond, and with which they effect their purposes. When we study their functions we perceive that each organ in the Cephalic zone requires the use of the brain; that each in the Pulmonic gives greater energy and activity to normal respiration; that each in the Cardiac zone is associated in its action with greater activity of the heart; that each in the Hepatic zone tends to increase the energy of the liver; and that all below the Hepatic zone promote the energy of digestion and consumption of food by their restless impulses and animal force.

The *Gastric* and *Abdominal* region, lying in front of the ear, along the jawbone, is the cerebral source of that activity in the stomach and alimentary canal which creates the exhaustion of hunger, and is therefore an important region to treat in cases of inactivity or disease of the stomach. A *predominant* action in this locality would not be the best thing for gastric health, but in touching this region the vital influence of the operator adds an element of health, and I frequently place the thumbs on Health, while the fingers stimulate the Gastric organ.

The most effective energy for the Gastric-abdominal region in treating the brain will be given by placing both hands on the occiput, covering the base of the cranium, while the fingers rest upon the Gastric organ just before the ear, or if standing before the patient, to place the thumbs on the Gastric organ, and the hands around the base of the cranium.

Immediately below the Gastric and Abdominal zone comes the *Crural*, which we cover with the hands on the neck. In the psychic sense it is a region of turbulence and restless animality; in a physiological sense the stimulation of the lower limbs to action and development. The demand for food, and the ability to dispose of it when swallowed, depend mainly upon the lateral portion of the occiput, and we have an interesting confirmation of this in an experiment of Dr. Ferrier, in which the desire for food in a monkey was destroyed by an injury of the posterior part of the brain.

The depressing influence of hunger and of gastric irritations may be diminished by the antagonists of the Gastric organ, which produce a feeling of buoyant energy and fortitude, which destroys the feeling of hunger. The South American medicine Erythroxylon Coca produces a similar effect. The organ of Fortitude, which resists the weakness and depression of hunger and other gloomy influences, is in front of the organ of Health, and exterior to the organ of Firmness. This does not produce entire indifference to food or incapacity to enjoy it, but relieves the gnawing and depressing feeling of

hunger. To produce entire indifference to food, it would be necessary to rouse the emotions of the upper surface of the brain, which lies in front of the vertical line. It is quite a familiar fact that love produces indifference to food. The greater activity of the superior conditions in women is the cause of their moderate appetites, which do not run into intemperance and gluttony.

A *morbid* or irritable zone may be recognized at the junction of the Hepatic and Gastric zones, each of which partakes largely of morbific capacities. Anteriorly, on the body, the morbific zone presents the epigastric and hypochondriac regions. The hypochondriac is so sensitive to all injurious influences as to become the chief inlet of disease, and is therefore marked as the region of Disease, while the epigastric is a region of extreme sensibility. The morbid zone of the body contains the most degenerate blood, the maximum congestive tendency, and the greatest sensibility to injury. A blow on this region anteriorly is the most prostrating and fatal that can be inflicted, and irritations in this region have the most depressing effect on the vital and moral energies. In Claude Bernard's experiments on the stomach of living dogs it was found that the introduction of a little boiling water threw the animal at once into a kind of adynamic state, which was followed by death in three or four hours. The mucous membrane of the stomach was found red and swollen, whilst an abundant exudation of blackish blood had taken place into the cavity of the organ. Like injurious effects, to a greater or less degree, followed an introduction of other irritants, such as nitrate of silver or ammonia. There is no other portion of the body where such prostrating effects could be produced by so small an amount of injury. Entire limbs may be destroyed by inflammation or suppuration, and large portions of the lungs may be destroyed by ulceration, without fatal consequences. The destruction of life by hot water in the stomach should warn us against the dangerous effects of continual drugging by harsh remedies, against which nature revolts. Medicines should be made so agreeable in their taste and other properties that they could not offend the stomach or the senses. It is difficult to accept the man as a friend, who insults us at his first approach, or who gives us a painful blow; and it may be as difficult to reconcile the stomach to the offensive agents that we thrust upon it, while it readily yields to the beneficent influence of mineral waters and of homœopathic medicines which are inoffensive.

Warm clothing around the waist, especially in front, is very debilitating and even prostrating, especially in warm weather, and the cooling of the waist by a wet cloth, or, as it is sometimes called, a wet pack, is often very wholesome and bracing. The anterior half of the morbid

zone is a region from which dispersive passes are very often required, and upon which we may often with great benefit apply the positive pole for currents to any part of the posterior surfaces of the body.

A curious illustration of the character of the morbid zone was furnished in the experiments of Brown-Séquard, who found that in dividing one half of the spinal cord, between the seventh dorsal and third lumbar nerves in the guinea pig, the animal in from three to five weeks became epileptic; also, that on the injured side there was a space one and one half inches long by one inch wide, just below the ear, where irritations or pinching would produce the epileptic fit. This cerebral influence corresponds to the principles of Sarcognomy.

The experiment of cauterizing the lower lobe of the ear for sciatica, which is said to have been successfully performed in France, is another illustration of the same principle, as it acts through the crural region.

A citizen of a Massachusetts village was lately arrested for boring his children's ears with a red-hot iron. He said that he did it to cure the toothache, and that he had often treated toothache in that manner.

Another illustration of the morbid zone was furnished in vivisections to destroy the supra-renal capsules, an operation of no formidable character, but in which the animals would die from injury of the solar plexus, unless great skill were exercised.

Morbidness or tendency to disease consists in an extreme capacity for feeling and being affected by injurious influences. Hence it can be developed fully only in the frontal regions. Farther back, as reactive energy appears, it assumes the character of irritability and quarrelsome or domineering aggressiveness — a condition morally morbid, which propagates moral and physical disease among its victims. This zone extends along the base of the brain, just over the meatus auditorius (cavity of the ear), and embraces a group of impulses which are discordant and wretched when they predominate, leading to a miserable life.

The reader will bear in mind that we do not regard disease as the primitive or normal function of any organ, but as the result of malign impressions on the sensitive and irritable condition which belongs to certain organs. The morbific faculties are those which are most easily disturbed and which have the least reactive power, and the morbid results occur when their irritation overpowers the sustaining vital energies which belong to the opposite class of faculties. Hence if the morbific faculties predominate in the constitution, morbid effects inevitably occur under the ordinary circumstances of home life.

As the *Crural region* (the source of the energy of the lower limbs) is located in the spinal cord and in the brain near the Gastro-abdom-

inal, it follows that active locomotion is an efficient invigorator for the digestive organs, and that the exercise of the cephalic zone giving predominance to the higher organs of the brain would diminish the activity of stomach and bowels, which is usually the effect of sedentary intellectual pursuits. The organs below the diaphragm all require an active life to give them energy, and in nervauric treatment they require the hands to be placed around the basis of the cranium.

In addition to the Morbid zone at the waist, which affects the physiological functions directly, there is another at the base of the pelvis which tends strongly to the disorder and prostration of the nervous system in mania, idiocy, and paralysis. It corresponds to a cephalic region at the base of the cranium, the anterior portion of which is the region of insanity. Even when the morbid region of the pelvis does not fully develop its sympathetic effects on the brain, it shows a similar deranging effect on the nervous system of the body, producing many derangements and diseases which are curable only when the pelvic irritation is removed, as has been fully demonstrated in Dr. Pratt's Treatise on Orificial Surgery.

When the hands are applied around the neck they are on the crural region, and send a stimulation into the lower limbs, giving them warmth and strength, and reinforcing animal life generally.

Although strictly speaking the organs developing through the neck (or reached through the neck) are those that correspond with the lower limbs and rouse their muscular energy, they are associated with organs a little higher, as the lower limbs are associated with the lumbar and sacral regions of the spine, the source of their impulses. Hence the base of the occiput, including Combativeness, should be impressed as well as the cervical region, when we would make the strongest impression on the lower limbs.

On the median line, on the level of the crural region, just below the occipital knob, corresponding to the middle region of the cerebellum and posterior to the medulla oblongata, is the region of Sexual Energy, corresponding with the lumbo-sacral junction of the spinal column, which vitalizes the sexual organs, adds much to the general vigor of the constitution, and gives a great stimulus to the nervous system, corresponding to the normal effects of sexual development, and therefore highly important in reanimating impaired constitutions. I have been especially struck with its value in renovating feeble or diseased eyes. The fingers of one hand being placed in the median fossa just mentioned, and the other in front, on the central organ of vision, just above the centre of the eyeball, gives a restorative, brightening influence to the eyes, more effective than any other mode of cerebral treatment. In giving this treatment the optic

nerves and their origin in the tubercula quadrigemina (optic lobes) are between the two localities treated.

The *Sexual* functions respond to two localities, the cerebellic fossa, already mentioned, a seat of physical energy, and the prominence of the larynx on the front of the neck, which coincides with the anterior surface of the spinal cord, near the foramen magnum. The doctrines of Gall, in reference to the cerebellum, were an approximation to the truth, as its sexual functions occupy a small portion on the median line.

Finally, while I regard the zonal arrangement as valuable, both in a philosophic sense and for therapeutic uses, I do not regard it as at all exempt from the intricate blending and co-operation which we find in the spinal region. Each organ has secondary relations or co-operations above and below its own zone, especially when influenced by the action of others.

Thus Alimentiveness, in its common action developing hunger, excites the reckless, combative, domineering energies of its own zone, which demand "bread or blood," and which in carnivorous animals drive them to attack their prey. But when fully satisfied it co-operates with the Cheerfulness and Serenity of the moral region, and then stimulates Adhesiveness, desiring society, the physical influence of which promotes nourishment and assimilation. Hence the pleasures of the table are best enjoyed socially, and few would desire to be solitary at their meals.

The region of Adhesiveness on the body is on the line of the intercostal nerves that surround the stomach, and the line of the splanchnic nerves that supply the stomach through the ganglia of the solar plexus. Hence we should expect it to co-operate as it does with the digestive functions.

Similar remarks may be made of the other zones, but they are not necessary in this brief exposition.

Special Functions for Cerebral Treatment.

HEALTH AND DISEASE. — When the fingers are placed on Health it gives a delightful recuperative influence to the whole system, and when passes or gentle frictions are made, upward and backward toward Health, from the region of Disease (at the cheek-bone, occupying the anterior end of the middle lobe, just behind the eyes) it adds materially to the effect. The influence of the organ of Health is heightened by placing the entire hand across the superior posterior region, covering Health and its neighbors. The hygienic region is the posterior part of the cerebral zone of the brain and a part of the cephalic zone of the body, which illustrates the proposition that

health is a high spiritual function depending mainly on the soul and brain.

SLEEP AND WAKEFULNESS. — The wakeful faculties are the intellectual, energetic, and restless. The centre of wakefulness is the intellectual organ of Consciousness, located in the centre of the forehead. Its antagonist is located on a line running back from it horizontally, about three fourths of an inch behind a vertical line corresponding to the back of the ear. This may be called the organ of Repose, and it is only when excited into absolute predominance over the frontal organ that it manifests the sleepy influence. Its normal influence when we are awake is to invigorate the automatic life of the body, and counteract the exhaustive influence of the intellect; also, to restrain its discursiveness and confine its action to objects nearer, more easily understood, and of more practical value; and, when the intellectual organs are fatigued, to bring on sleep and sustain the unconscious processes of interior life.

I have often produced sleep by this organ, and I find it best to use the organ of Somnolence, an inch behind the brow, to facilitate the process. The region of Somnolence greatly increases the impressibility; after the fingers rest upon it a few minutes, a calm, dreamy feeling is developed and the eyes wink or close. A dreamy sleep is produced in the very impressible, and sometimes runs into completely unconscious sleep. When the two organs are touched at once, a sound sleep is the usual result, which may be assisted or retarded by other influences. The amiable organs of the upper surface of the brain produce a contented quietness which favors sleep. Patience and Tranquillity (see map) assist, as Irritability and Turbulence hinder. The most efficient co-operation is the organ of Lethargy, which we reach just above the larynx (see map), which promotes a dull drowsiness. In removing sleep we disperse from Somnolence, Lethargy, and Sleep, upward and backward, touch the organ of Consciousness, the organ of Light (or vision), and any of the energetic organs, such as Health, Energy, Ambition, and Turbulence.

THE IDEAL POWERS. — For the display of intellectual and spiritual phenomena, we may excite the Somnolent region to increase impressibility and intuition. By the organ of Spirituality (see map) we may excite the capacity for feeling and perceiving spiritual influences, which may be brought to the mind by holding on the forehead a letter of some deceased friend, or a picture — the psychometric impression from which may bring a consciousness of the present condition of the departed. To give more varied perceptions we may touch the region of Clairvoyance, lying at the root of the nose (occupying the internal base of the front lobe).

General Vigor may be promoted by placing one hand across the region surrounding Health — the superior posterior part of the occiput, — and the other around the lower part of the occiput, or by placing the fingers upon Health, Vital Force, and the sexual region in the fossa below the occipital knob.

Feverish Conditions may best be treated on the body, but may be assisted by treatment on the head, making dispersive passes from Calorification and Disease to Health, and stimulating the organ of Coolness, which lies on a vertical line corresponding with the posterior margin of the ear, extending two or three inches upward from the level of the top of the ear.

Mental Soundness. — The region of Sanity is the seat of those energies which resist every form of mental disorder, whether Insanity, Dementia, Melancholia, Monomania, Lethargy, Idiocy, Childishness, Hysteria, Delirium Tremens, Rage, Homicidal Mania, Suicide, or Kleptomania. The insane tendencies are reached under the jaw; hence passes from the junction of the neck and the jaw toward Sanity would have a good effect. Melancholy has a somewhat higher location (on the lower angle of the jaw), and the special antagonist of Melancholy — the region of Cheerfulness — is situated just above Sanity, being above the parietal ridge and on the superior aspect of the head. The excitement of the organ of Cheerfulness produces a delightfully cheering effect, removing all mental depression. The special locations of Idiocy, Childishness, Hysteria, Melancholy, and Lethargy are shown on the map.

Warmth. — The region of warmth in the head is the anterior aspect of the medulla oblongata, and its external surface is at the chin. The hand placed around the chin stimulates Calorification, and the effect is enhanced by placing the other hand on the occipital base, which is a co-operative region. If the hand also extends down the neck in the crural region it tends to throw the warmth to the lower limbs. There is a secondary region of warmth in the centre of the temples, which operates more interiorly and has more of a psychic character.

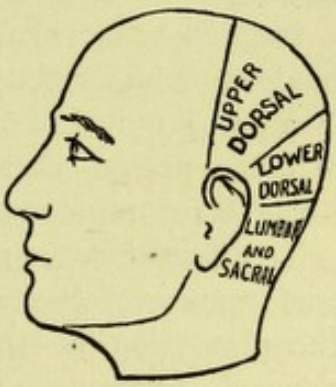
Mental Discipline and Concentration are best promoted by the region of Sanity, especially its anterior portion, in which we find that power of quiet concentration, as well as the disposition to local attachment and fixedness of residence which phrenologists have ascribed to the space just behind Dignity or Self-Esteem on the median line — a location which I find entirely erroneous. It is the regions of Insanity and Turbulence which destroy mental concentration.

Nature of Nervauric Treatment. — The reader understands

that the application of the fingers or hands to any part of the head or body of an impressible individual stimulates the functions of that locality. But much depends upon the character of the hand that is applied. If it belongs to a person of feeble vitality, far inferior to the person touched, it will not have a stimulating effect. The contact of a very inferior constitution is of no benefit to the superior person; and on the other hand a person of very superior vital endowments imparts a stimulating effect to every one that he touches, bringing out strong local manifestations. In addition to this the diffusive influence of his own constitution is imparted to the subject, so that there will be health and restoration in every touch, and a strong healing power exerted whenever he approaches the patient. Persons of such endowments are capable of making cures by merely coming into the presence of the patient, and may cure great numbers with extreme rapidity.

Again, there are those whose psychic power occupies so large a sphere that they sympathize with patients at a distance, and by means of this *rapport* are able to relieve or cure them as if personally present. I know physicians who have this sympathy with distant patients, and I have even sometimes felt the influence of a morbid condition in friends at a distance, so as to know the exact time of their suffering and its termination. There are many well-attested cases in which patients at a distance were healed by the late Dr. J. R. Newton.

The psychic power that goes with fixed attention or with the touch of the hand may be conveyed to those of psychometric sensitiveness by a letter or by a piece of paper which has received the nervaura of the operator. The healing of patients by what is called magnetized paper has been carried on extensively, and is abundantly attested by the patients.



The correspondence of the occiput with the spinal column is shown in this engraving; and the correlation of the occipito-spinal region with the anterior organs of the brain is shown on page 76.

CHAPTER IX.

HEALTH, AND ITS RESTORATION.

Definition of Health as an organ and faculty — Why that name is used — Effects of the organ of Health — Animation — Health associated with happiness, virtue, and activity — Position and influence of the organ — Its ethical and spiritual relations — Vital power and animation, disease and death — Function of the shoulders and crown of the head — Relations of Health to ethics and religion — Its position in the brain between the moral and physical — The spiritual as the support of physical health — Deficiency of Language for nomenclature — Bia, Zoe, Anima, Animus, Psyche, Psychobiosis, and Psychodynamia as names — Animation and Health — Difficulty of expressing psychic and physical life in conjunction — Their combination in the superior posterior region of the brain and body — Healthful physical and moral exercises — Cultivation of the sentiments qualifies for healing — Love and Health correlative — Experience of Dr. Jennings — Personal healing by Newton and others — The religious and spiritual elements — Necessity of scientific preparation for healing.

Psychic Treatment.—Permanent or constitutional health should be established — This requires moral power, not passive or negative, but active virtues — Power the element of success — Pursuit of duty the only satisfactory success — The higher virtues, heroic — Happiness may be brought to families and a perfect education to youth — Psychic treatment an indispensable part of education — Health and Virtue twin brothers — Special directions for treatment by the hand and the battery.

The object of all treatment is the restoration of health, and it is necessary to understand in what that consists. Health, in the *negative* sense, is freedom from all disturbing injurious influence, leaving us to enjoy all the pleasures of life as we obtain them.

In this sense health is obtained by removing from the blood all noxious or imperfectly vitalized elements, and promoting the absorption and removal of all objectionable structures, such as the tubercle of consumption or the cells of cancerous matter, leaving the vital force to act unincumbered.

To effect this, we must rouse all the secreting organs to the full performance of their duty; for the purity of the blood depends on the perfection of the secretions. This must be done either by medical or nervauric treatment. We must find the organ, or organs, which are diseased or sluggish, and rouse them into proper action, at the same time strengthening the vital force to assist.

But health in the positive sense means much more than this. It means a healthy or disease-resisting constitution — the predominance of vital power, resisting injuries, over Sensibility and Excitability which succumb. Hence, after the restoration of morbid organs and relief from morbid conditions, we should energize the faculties and organs which give the highest conditions of health.

Perfect health is a condition in which there is a large amount of physical and moral energy, and in which the sensibility, excitability, and irritability, though sufficient for all necessary purposes, are small in comparison with the vital forces, which endure and resist the attacks upon our sensibility.

The revolutionary discovery of the new Anthropology is, that all forces and faculties belonging to man have their special seats in the brain, and corresponding positions in the body. Every elementary power or tendency culminates to a certain locality. Health culminates to its locality in the brain, on each side of Self-Respect or Dignity, and in the body to the middle of each shoulder blade. The development of these two localities insures a healthy constitution. But I must protest in the beginning against the phraseology which I am compelled to use by the poverty of the English language. The word Health does not adequately represent the function of the cephalic and corporeal organs to which I have applied it, for the word has merely a negative meaning, signifying an agreeable freedom from the influences which cause disease, and their results. No cerebral organ can give us freedom from the causes of disease, and thus compel health, but as the organ in question gives us the vital force which resists disease, and thereby sustains a vigorous health, I have hence been induced to use the word health to express its function, as it generally produces health when sufficiently developed, as the opposite sensitive region is sure to result in disease if sufficiently predominant. The word health, therefore, as it expresses the tendency of the organ, has been used for physiological and hygienic instruction. It is not deceptive, for the influence of the region of Health, either in the brain or in the body, whenever excited, is to produce an immediate improvement of the physical and mental condition. The lungs expand more freely and pleasantly, the brain becomes clearer and more active, the emotions more vivid, the impulses stronger, the muscles more ready for action, the countenance more inclined to smile, and all the viscera, lungs, stomach, liver, kidneys, etc., begin to feel better, and, if troubled with any disorder, to diminish or remove it. It is the general renovator of disturbed functions, and the power that resists the encroachment of all malign influences on either mind or body. But health is only one aspect of its effects — the negative aspect. Its positive character is *vital power* and harmony — *normal life.* It animates alike the physical and the moral constitution. It is cheerful, energetic, strong, pleasing, attractive. It gives perfect and exuberant activity to the entire physical, social, moral, and intellectual faculties. It animates every nerve, function, and faculty to normal action, and if required to

select the word which comes nearest to expressing its efficient and ubiquitous influence, as I have habitually witnessed it in the impressible and felt it in myself, I should select the word ANIMATION. But the word animation must be understood in its largest sense, as animation of the entire being in its perfect action and sustained power and virtue. Indeed the word *virtue* is almost as good a name as animation.

"Happiness is health," said Dr. Geo. Moore in his essay on the Body and Mind, and this is near the truth. Happiness, which is synonymous with the best activity of the coronal region of the brain (and the summit of the chest), in which the faculties of love and hope reside, may be regarded as spiritual health, for it is a condition of harmonious activity of our higher powers — the whole upper half of the brain.

But while this admirably adapts man to the celestial life in which just such a character is found, it is not so well adapted to the struggling, warring condition of life on earth, as a faculty of more physical energy. This faculty we may find in the region to which I have given the name of 'Health,' which is associated with the upper posterior region of the brain and the posterior surface of the shoulder.

Health as thus located is between the amiable spiritual energies of the upper surface of the brain and the more physical energies of the occiput, which location enables it to combine them happily, producing a vigorous combination of spiritual and physical energies, and restraining more effectively than Hope that extreme sensibility which produces liability to disease, and that extreme sympathy with others which is not expedient in earth life.

Health in this vigorous form may be called happiness, but it is not that intense or ecstatic happiness which belongs to the celestial region of the brain.

The faculty of the organ of Health leads to a constant activity of mind and body and to all things that promote health. This activity is the indispensable condition of health, and it was well expressed by the elder Cato: "Let a man be but constantly exercised in labors like these, and he will not so soon find the breaches of age. Years will steal upon him insensibly; he will grow old without feeling it; nay, when he comes to break at last, the house will crumble gently and fall down so slowly as not to give him any pain."

It is an obvious truth in reference to all human faculties that they are developed to their highest power by regular vigorous exercise and by enjoying that which is congenial to their nature — avoiding what is depressing. The exercise and culture of any faculty is found in that which it spontaneously does — as the faculty of love is culti-

vated by loving, and the propensity to murder by committing murder. The faculty of Health prompts to an active, gay, and cheerful life, industrious, social, friendly, graceful, courteous, and interesting in manners — a life of useful activity, not much affected or hindered by any little discomforts or social discords — a life which diffuses a pleasant influence. This is quite different from the life of the solitary student and the solitary workman or the ascetic religious recluse. It is realized only in social and conjugal life. Hence *friendly social intercourse is essential to health*, as well as cheerful employment; and the social amusements which a false and gloomy theology has discouraged are of great importance to health and virtue; and of all social amusements I know of none entitled to rank higher than dancing, associated as it is with that other inspiring influence — music. Hence I insist that the cultivation of congenial society and amusements should be a part of the regimen prescribed for health, and that with these should be associated active industry.

Animation, as developed by this organ, vitalizes and perfects the entire being; and its antagonist in the region of disease, uncontrolled, reduces both soul and body to worthlessness — the body going into the decomposition of death, and the soul being often reduced also to helplessness until released from the body; for the capacity to suffer and not to act is a fatal condition.

Perfect health, that is, abundant vital power capable of resisting all causes of disease or depression, and sustaining by sympathy and nervauric action the health, energy, and spirits of others — depends upon the large development and cultivation of this region of Health and Animation; it requires a large development of the shoulders and the crown of the head, and the position of this function in the constitution is such as to give by its connections (being in the upper half of the brain) a decided predominance of the coronal or moral elements, while by its posterior location it gives all the necessary energy to the occipito-basilar organs, in which we have a *vital force*, unregulated by the moral, needing the control of the intermediate organ of Health, which sustains both.

The organ of Health, by sustaining the higher faculties, not only controls the excesses of the lower, but places man in harmony with the supernal powers, and the influx which is the interior of his life. Thus the true science of health is connected with ethical or religious science and the performance of duties; and all hygienic science which rests in the physical alone will fall short of human needs. The emotional or spiritual part of man's nature is as important as the physical, and this is being continually demonstrated by the vast number of cures made by spiritual and religious methods, without any drug agency.

The fact that the organ of Health stands intermediate between the moral and physical agencies of the constitution, so as to give to each its own just proportional activity, explains the great necessity for both soul culture and physical culture in any proper system of hygiene and education, and gives us an entirely new view of the philosophy of human development and of the intimate relations of health with virtue and religion, whereby we learn the importance of the cultivation and exaltation of health as a religious duty, and the criminality of its neglect or abuse. True and complete Godliness brings with it physical perfection and power — power to encounter exposure, danger, and toil, triumphantly, as did the Apostles. But the purblind theologies, which have been in fashion, take little account of the body, though saintly and apostolic history shows how gloriously the body has been sustained by the spirit, not only in such as Joan of Arc, but in many thousand earnest seekers of divine life.

We cannot say too much of this philosophy of man's nobler life, which has been so little understood; we have not even language fitting for its expression. Language must advance, both in its concepts and its combinations, to keep pace with science and philosophy.

The *Bia* and *Bios* of the Greeks, whence our Biology, belongs to material life alone. They express only the lower life, that which lies behind the mastoid process, which occupies the cerebellum and medulla oblongata, which ceases with their decomposition, and which is not true life, the characteristic of which is its indestructible permanence.

Psyche, the soul, comes nearer to our conception of the central power, but it has been used in a mental and spiritual sense, which isolates it from the bodily life and would carry us into the high realms of spirit life. But the unspiritual genius of European races continually tends to the degeneration of language. It has degraded Biology into a purely physical science, and it has nearly expurgated the soul essence of Psychology, reducing it to a little more than a *speculation* on mundane mentality — confounding *Psyche* and *Mens* — Psychology and a barren Metaphysics.

We might be tempted to unite the spiritual and physical in such a compound as Psycho-biosis, but that would be a clumsy patchwork of elements, each of which is withered and degenerated in literature.

We need a single word containing in itself the ideas partially represented by the words Manhood, Life, Health, Virtue, and Animation, with an intimation of the exuberance of a happy nature, but there is no such word to express a happy and efficient Psycho-zoic existence.

Our verbal difficulty arises from the fact that soul and body, objectively (and not subjectively) considered, are so far apart and distinct

in the common mind, which dwells on material things, that they are seldom unitized in thought. A different set of words applies to each, yet such is their parallelism that a single word is often applicable to them both — as, for example, Firmness, Energy, Excitement, Restlessness, Tranquillity, Languor, Depression, Weakness, etc.

Psycho-dynamia, or psycho-dynamy, expresses much of the compound idea, but conveys more of the power and less of the happy, normal completeness of life than belongs to the health region of the brain. It expresses mainly the firmness and dignity which are found at the posterior part of the sagittal suture and at the summit of the dorsal region of the spinal column.

The Greek *Pneuma* is closely analogous to *Psyche* and has not been desecrated by metaphysical speculation. *Pneumatology* has been left to represent the real and substantial science of the soul, apart from the body, but as it represents the separated soul, it cannot represent the embodied soul, with its armament of physical power. Pneuma represents, by its double sense, the air or breath which is the influx of the body and the analogous aura or soul which is the influx of the brain. Hence, Pneumatics is the science of the atmosphere, and Pneumatology the science of the ethereal realm of the soul.

Nearly equivalent for the Biological is the Zoic group of words — Zoon, a living creature (whence *Zoology*, the science of animals); Zoos, living; Zoe, life; Zoeros, vivacious or full of life; and Zootes, the animal nature as opposed to the divine nature. The life thus expressed is like the biological, and lacks the psychic or pneumatic element.

In the Latin, too, we find that words representing air or breath represent also the spiritual element, as if it had been intuitively perceived that our spiritual life is like our breath, an influx of the invisible.

Anima signifies alike the air or breeze, the breath, and the vital principle or life. Thus it represents animal life, though sometimes poetically extended to the departed spirit. *Animus* is a word of more vital and energetic meaning; it suggests the thinking, feeling, willing, emotional soul. It suggests all the strong emotions, impulses, and determinations of the departed spirit, and is not void of courage, hope, and pleasure. It is, therefore, the most expressive word for the full normal life which comes from the superior posterior region of the brain. Anglicised in *Animation*, it expresses better than any other term the central element of life and character, which I find the supremely beneficent and dominant quality of perfect life. Possibly some other ancient language may have a better expression, but the Romans, whose powerful *animus* ruled the world, have given us the best word extant in our language for our present purposes; but even this has not

as much of the pleasing, attractive, persuasive, charming, ethical element as nature has given us in the supreme faculty which wins as well as commands, which gives to life its best enjoyment and highest success. We need four words, such as health, energy, happiness, and cheerfulness, to express its full influence and power; though animation may correctly express its influence when the moral element is not prominent, and therefore may often be an adequate expression. It gives animation alike to the intellectual, moral, and animal faculties, and tends to give them a symmetrical development — making a character decidedly attractive.

Speaking of this supreme faculty, as I have done, for therapeutic effects, I have called it HEALTH, because perfect, active health is the condition which it produces; when in predominance it develops active, exuberant, attractive, and pleasing animation; it gives a feeling of purity and brightness in the entire person, and a glow of kindly, social feeling, with a desire to be loved, fitting one for every social duty. I am almost induced to coin a word to express this admirable faculty, but for the present let the word Health answer, with a rich and abundant significance, including animation.

Understanding, then, that the superior posterior region of the brain and the superior posterior region of the body are the harmonic centres of perfect life, whatever they may be called (this perfect life being concentred at the location provisionally named Health) to give this nobler portion of the constitution absolute predominance in ourselves and in our patients is what we should seek as healers, and any system of bodily exercises which strongly develops the shoulders, especially such as the health-lift and rowing, will be an important addition to curative resources, not only for the patient but for the healer himself, who should frequently use such exercises, and will find them beneficial, especially just before going to heal his patients.

In addition to these physical exercises there are certain moral exercises by which the healer sustains himself in his duties. These moral exercises consist chiefly in making friends and followers, by attractive and impressive manners, in associating with friends and gaining the strength which comes from their admiration, love, and sympathy. He should, therefore, as a truly religious man, cultivate the most affectionate and hospitable sentiments towards all, and should endeavor, not rudely or boldly, but in the most pleasing manner, to take the lead in society and make himself an object of interest. If he can take the position of a public teacher or lecturer it will make an important addition to his moral force, and if he can so cultivate his nobler nature as to become the centre, the reservoir, or the channel of that purest health, life, and love which belong to the spirit world, he is then admirably equipped for his mission.

The sustained strength of his own perfect life enables him to diffuse a similar sustaining energy, while his love gives him a pleasure in uplifting others, and a power to benefit them by his mere presence and everything that emanates from him.

Love and life are correlative. Love is that which energizes and sustains life. Love in each member of a family sustains life in all the others. Wives pine in health when the husband's love declines; men decline in their whole nature when not sustained by love at home. The patients of a loving physician delight in his presence and live upon his influence, sometimes regardless of his drugs, as was shown in the somewhat famous case of the honest Dr. Jennings, of Derby, Conn., who, over forty years ago, becoming convinced that his medicines produced little good effect, gradually reduced his doses, and finally gave them up entirely, substituting bread pills and colored powders and liquids, and continued a practice so successful that after he had publicly confessed that he used no medicine the people adhered to him and could not be persuaded to patronize another physician, even when recommended by Dr. J. himself.

To what extent the mere presence of the healer may be a substitute for all other healing agencies depends upon his personal endowments. Dr. J. R. Newton, Dr. G. Swan, and many others, have cured successfully without contact, and at a distance, and it is presumable (but not inevitably necessary) that these remarkable cures were made with the co-operation of attendant spirits. Prayer, which brings in spiritual co-operation, has cured so many hundreds in a public and very marvellous manner that no candid student acquainted with the facts can doubt that the religious element is a large part of the healing power — operating not only by the loving and curative energy developed in the constitution of the healer, but by the abundant spiritual influence which he attracts to himself spontaneously, as well as by prayers.

Armed with health, vigor, buoyant energy, and love, guarded by the precautions I have fully explained, and reinforced by the invisible power which aids the spiritual-minded man, the healer must be successful, and in proportion to his power may achieve those results which the world calls miraculous.

But to achieve any results wisely and well he must thoroughly understand that in which he is engaged. He must thoroughly understand the human constitution, and the laws of its operation which are developed by SARCOGNOMY. Even when he acts as the passive instrument of spirit power, the same knowledge is important, for the ability of the spirit to produce results depends largely upon the character, the natural capacities, and acquired skill and knowledge of the medium. The highest manifestation that spirits can

make of artistic, musical, literary, or philosophic power depends upon the natural capacity and acquired skill of the medium. Through a medium of artistic ability fine works of art are produced which would be impossible under other conditions; wise utterances come through mediums of superior intuitive intellectual power; and the very best medical results will be produced only through mediums of good intellectual power, well educated in the sciences of life, disease, and therapeutics.

It is evident that a spirit operating through any medium must be hampered by the limited powers and ideas of the medium's brain, even if the mediumship be complete and passive. The wisdom and moral power of a man cannot come through the brain of a child or a horse. An ignorant an unscientific medium cannot do full justice to the healing art. Moreover, the spirits who come to aid in treatment are in many cases themselves too ignorant and unscientific to compensate for the deficiencies of the medium.

The healer who is neither gifted with psychometric intuition, nor sustained by spirit power, nor instructed in Sarcognomy, must operate in a blind and often erroneous manner in nervauric and electric treatment.

The noblest embodiment of the healing art, the most worthy of public esteem, is the physician who has been drawn into the profession by his active benevolence and psychometric skill in understanding diseases, who after going through the usual studies of the colleges has perceived the inadequacy of their remedies, and devoted himself to the investigation of the materia medica; who has felt the inadequacy of their physiology and philosophy, made himself acquainted with the power of what is called animal magnetism, and then, recognizing its destitution of a scientific basis, has found in Sarcognomy the laws of nervauric and electric healing which he applies under the guidance of his intuitions, while using remedies selected with similar skill adapted to the varying conditions of patients, instead of the mere names of diseases.

Psycho-Hygienic Treatment.

The enlightened healer will not limit himself to treating the derangements of the body; for so close is the parallelism of physiological and psychological processes that one cannot be treated without producing an influence upon the other. When we restore the body to health we improve the functions of the brain and assist the moral nature.

But actual health, or relief from the conditions of disease produced by injurious causes, is merely a state, and is not fundamental or con-

stitutional health — the possession of a health power to resist disease and to sustain every function of life. One may be relieved from disease and yet be extremely liable to falling again into depraved conditions. Hence the permanent improvement of the constitution is more important than the immediate relief of morbid conditions, and it is a characteristic doctrine of the new physiology that this improvement and elevation of the type of the constitution requires an increase of the moral power — an increase of those calm energies which belong to the soul and to the superior regions of the brain and the body; hence all hygienic treatment should be ethical in tendency, and the healer should aim to leave his patient, if possible, with an exalted energy in his higher nature, which would tend to lead him into a better and healthier life.

But in cultivating this noble manhood and womanhood it is important not to mistake the passive negative virtues for the divinely sustaining elements of life. All conceptions of duty are relatively worthless which do not lead to action.

The amiable sentiments must exist in sufficient force to control all selfish and misanthropic feelings; but *mere* amiability with unselfishness is not the condition or character to which the laws of the universe accord success and the happiness of robust health; and thousands of good people with this false ideal in their minds have met with misfortunes, both physical and spiritual, from acting on this erroneous view, and have found fault with the world and its Creator because they have been unfortunate when they have not conformed to the conditions of success, which demand active power as well as unselfishness.

The survey of the world in any department, with a spirit of candid search for truth, will teach us that *power* is the chief element of success, but that the only satisfactory and happy success is that which is attained by noble means. The success of the carnivorous animal, the despot, the soldier, the miser, or the knave is a physical success in which there is very little happiness and often very little health. But that success which is gained by heroic energy in the pursuit of noble aims, with pleasing manners that win the love of all, is the only true and satisfactory success. This comes from the upper occipital region in which the higher energies reside, and which is associated with the upper posterior portion of the trunk.

Our conception of virtue should be that of a positive power, acting with that broad sympathy and intuitive understanding which realize that happiness cannot be an isolated condition, and that he who would enter the sphere of true happiness must make a sphere of happiness around him in human beings, and should never relax in the

pursuit of the noble aims to which his life is devoted. Firmness and energy are the virtues that command success, and he who fails to exercise them should blame himself and not the world for his failure. Godliness, a God-likeness which brings success, is not the sentimental and egotistic quality cultivated by the Pharisee, but that nobler quality which achieves grand results in thought, in action, in society, in government, and in the triumphs of civilization — a quality which in Patrick Henry moved multitudes, in Washington ruled a nation, in Jefferson led the progress of liberal thought, a quality that insures noble aims and noble action.

To cultivate these virtues as accessory to health, the healer should keep his patient under the influence of the upper zone of the body and of the brain, in a cheerful, energetic mental condition. The tranquil amiability of the upper frontal surface of the chest should be combined with the amiable but positive energy of the summit of the back, on and between the shoulders, and of the arms. *The gentler virtues should never be separated from the energies.*

By these manipulations discontented and discordant husbands and wives might sometimes be restored to harmony, as the causes of quarrels which seemed so important while they were under the influence of irritation and gloom would appear very unimportant when good-humor was restored. The restoration of harmony would contribute greatly to the restoration of health, for there are thousands whose health is depressed by domestic inharmony.

In the management of children psychic manipulation is very important, for there are few that might not be favorably affected. The more impressible class are creatures of circumstances. In a turbulent school they speedily absorb all the depravity they mingle with; but the gentle manipulation of parents may remove many evil influences, conquer ill-temper and confirm habits of application. This treatment will hereafter claim an important part in systems of education, and no one will be considered qualified as a teacher who cannot with his hands exert a soothing and refining influence.

The evil tendencies of the animal nature will be subdued in body and in brain by dispersive passes and by electric currents, while the virtues will be energized at their source in the upper regions of the brain and body, as indicated by Anthropology.

Psychic or moral treatment is not within the scope of this volume, but it becomes incidentally a part of the therapeutic treatment, and it certainly comes within the duties of the true physician, the competent healer, for health and virtue are twin brothers.

To carry out the doctrines of this chapter, the physician should aim to establish the predominance of the shoulders and the upper occipital region of the brain.

1. First, he should use the refreshing dispersive passes from the lower margin of the abdomen toward the shoulders. This disperses morbid and debilitating nervous conditions. A similar influence may be produced on the head by brisk dispersive passes from the cheek-bones toward the crown of the head — the centre of the scalp, which is near the posterior end of the sagittal suture.

2. He should stimulate the shoulders and the whole upper dorsal region, for a space of six by twelve or fifteen inches across the back, by the application of his hands and by a gentle percussion, using vigor in his muscles but gentleness of touch in contact, unless in a robust person.

3. When the hands are resting on the back they should be in the centre of each shoulder blade. If the operator is a sensitive percipient he will recognize, while his hands are in this position, the increasing comfort and brightness in the patient's condition, and if he is left in that condition, its beneficial influences will in many cases continue for hours.

4. The effect may be enhanced by placing one hand across the upper occiput from right to left, covering the region of Health, while the other is on the Health region of the shoulder.

5. If the patient is nervous, restless, or melancholic, one hand may be placed in the armpit at the region of Cheerfulness, while the other is on Health, or both may be applied at Cheerfulness.

6. If the patient has any selfish, morose, or gloomy qualities, or is lacking in the enjoyment of kindly emotions and elevated views of duty, the hands should be applied on the upper surface of the shoulder and the chest as far down as the nipple, the effect of which will be soothing and pleasant as well as beneficial to his moral nature, and will assist in the restoration of health. This is the remedy for bad temper, selfishness, gloom, and domestic discord.

7. While the hand is kept on the shoulder or the healthful region of the head, special treatment may be given with the other hand in application to the various localities that need attention, the effect being greatly enhanced by the hand on the shoulder.

8. If treatment be administered by the battery, the hygienic current should be administered by applying the positive pole with a broad electrode (a carbon plate or large sponge wet with warm salt water) at the hypochondria, the spot marked as the region of disease, and the negative with a large electrode on the health region of the shoulder. For the best effect there should be two electrodes or rather rheophores to each pole, that the right and left sides may be treated simultaneously. The current may be given from five, ten, or twenty cells, according to the sensibility of the patient, and continued

from five to twenty minutes. If small rheophores are applied to the skin they should be moved about. This is less important with large rheophores.

With the common portable battery the primary or magneto-galvanic current is generally appropriate.

In using static electricity the application of the negative electrodes near the shoulders and the spinal column generally, drawing a gentle current or sparks, is the most valuable method.

9. If the patient needs the influence of any special medicine, it may be administered by dipping the positive sponges in a solution so as to have the current pass through it, or a slighter influence may be imparted by applying a strong solution on the skin and passing the current through it. The epigastrium is the most effective place for medical application. In using the faradic current the medical applications may be made at each pole.

10. If the faradic current be used, it may be applied as a local stimulus by applying one pole on each shoulder at the site of Health, or by applying two poles near each other at any position needing stimulus. In doing this, however, a broad carbon rheophore is best, covered with wet cloth or leather; a broad sponge will answer the same purpose. A broad soothing rheophore is necessary when the poles are near each other; the best material for which is carbon. The alternating galvanic currents may be used in the same way as a local stimulus by applying them near together with frequent interruptions. One of the rheophores may be used for this purpose by a rapid tapping or a gliding over the surface which produces the broken current that stimulates.

11. There is no current in electro-therapeutics at all comparable to the hygienic current from the hypochondria to the shoulder, and in applying this current the negative pole may be applied not only to the site of Health, but over the entire upper half of the surface of the back, thus producing a great variety of tonic and restorative effects, as shown by the map of Sarcognomy. Thus we may invigorate the brain, lungs, heart, liver, and stomach, or administer general tonics, as will be explained.

12. The hygienic region or upper portion of the back and of the occiput will generally restore pleasant and amiable feelings, especially in conjunction with the cheerfulness of the axilla, but whenever a positively amiable influence is needed we should treat the whole upper frontal surface of the chest, on which we develop the warmest sentiments of affection, duty, and religion.

13. The reader will bear in mind that the effect of nervauric operations is materially enhanced by previously exciting impressibility at

the lower end of the sternum, or in the temples an inch behind the brow.

14. Alternating galvanic currents through the upper portion of the chest, antero-posteriorly, rouse the best elements of the physical and moral constitution. The anterior organs being correlative (or fraternally associated) with the posterior, their simultaneous stimulation corresponds with normal life. Hence, we may establish rules for the conjoint stimulation of the correlative anterior and posterior organs throughout the body. The treatment of consumptive patients by currents through the chest was an approximation to this principle made by a Belgian physician, whose reports of his success were so extraordinary as to be considered incredible by Dr. Beard, the author of a standard work on electro-therapeutics.

For a fuller exposition of electric treatment, I must refer the reader to the chapter on electro-therapeutics.

CHAPTER X.

OPERATIVE METHODS.

Transmission of vital power — Proof by experiments on frogs and by anatomy — Failure of electrical experiments by eminent physiologists — Functions of the convolutions which they could not reach — My reasons for neglecting galvanism — Medical opposition — Psycho-vital influences most appropriate to the brain — Discussion of the experiments of Fritzch and Hitzig — How to begin experiments — Use of plasters and other agents — Familiar illustrations of Sarcognomy — Pathological illustrations — Initiating experiments — Vital emanations — Positive and negative poles — Evils and dangers of electricity — Relations of operator and patient — Necessary influences for the operator — Spiritual inspiration; its philosophy and power — Power of diagnosis — Prof. Draper's testimony as to the spirit — Conduct in the sick chamber; hygienic precautions — Dispersive manipulations — Non-conductors — Effect of passes — Quackery of massage — Activity in healing — Precautions for maintenance of health — Dangers of contagion.

In nervauric therapeutics we use every region of the brain and body for the production of physiological and therapeutic effects, and we rouse these regions by the application of the hand, which is their proper and congenial stimulus in the impressible constitution.

That the vital force and vital processes of one constitution should rouse similar processes in another is a proposition strongly resisted by most physiologists, notwithstanding their familiar knowledge of the transmission of pathological processes which reproduce exactly the same disease by their emanations.

There is an experiment on the limbs of frogs which might assist these sceptics to realize such transmission. If the frog galvanoscope is used by placing the nerve of the leg across the muscles of another frog's leg and then passing a feeble electric current through the nerves of the latter, sufficient to convulse its muscles, the convulsive movement will also appear in the leg which has its nerve resting upon the convulsed muscle. This is not simply due to a passage of electricity, for if a non-conductor, such as a thin plate of mica, be interposed between the second nerve and the first muscle, it does not prevent the convulsion, which shows that a convulsion in one muscle may transmit an influence which will convulse another muscle — an influence which is distinct from electricity, as it is not hindered by electric non-conductors (see Philos. Transactions, 1847, p. 231).

But it is not necessary to employ electricity at all; the muscles of

a frog, a dog, or a rabbit may be convulsed by irritating the spinal cord mechanically, and the frog nerve, if in contact with the convulsed muscle, will transfer the convulsive action to its own muscle, and it may be transmitted still further, so that a series of five or six nerves may be started into action by the first.

The same principle may be illustrated in man. If we contract firmly the flexor muscles which close the hand and bring our muscles into contact with those of a sensitive or impressible person who is passive, the emanating influence will gradually cause a contraction in the same muscles, which, not being voluntary, will not obey the will, but will pass off gradually.

This experiment illustrates the general law which has long been applied to healing, and which I have applied to experimental investigation — that all vital and psychic processes are transferable, as well as the pathological and the muscular.

That there are nervauric currents in the body would seem self-evident when we know that compression of a motor nerve paralyzes its muscle. Evidently something passes which pressure interrupts. Moreover, how can we conceive voluntary muscular action without believing that the current which is allowed to pass down the unimpeded nerve passes from the nerve to the muscular fibre. The picture of nerve filaments passing among the muscular fibres of the Hyla (green tree frog), given by that admirable microscopist, Dr. Lionel Beale, shows the nervous and muscular filaments entirely distinct. (See plate of Bioplasm and Nerves, fig. 9, page 62.) We cannot understand how the nerve filaments put the muscular into action unless something passes between them.

It would seem a necessary consequence that any agents passing from the brain and spinal cord to the muscles or any other structures might pass into any other structures that were in contact or proximity.

In the European experiments on the brain, with electricity, the results have been extremely barren, not only because electricity is not the proper stimulant for psychic functions, but because the investigation was not conducted in a psychic spirit. As Althaus says, "Although the induced current may penetrate to the brain, it seems to exert only little influence on it, just as on the retina and other organs of special sense."

Longet entirely failed to produce muscular action by operating on either the white or the gray substance of the cerebral hemispheres by galvanism or by mechanical and chemical irritation.

Weber, Majendie, Budge, Schiff, Matteucci, and Van Deen all failed to produce any physical results in the body by galvanic and

faradic electricity applied to the hemispheres of the cerebrum and the cerebellum in an enormous number of experiments and the sacrifice of a vast number of animals. The muscular system was reached in such experiments only by the motor nerves, the spinal cord and its commanding summit in the brain before its expansion is lost in the hemispheres, that is to say, in the medulla oblongata, the crura cerebri, and the tubercula quadrigemina, which in animals are called the optic lobes, and which thus appear to be the summit of the muscular tract that responds by electricity; although we know that in vital action the volitionary power that commands the muscles proceeds from the *corpora striata*, and that these are controlled by the higher organs of the brain. But electricity is so ill-adapted to the higher processes of life that it produced no muscular response to these laborious and skilful experimenters above the tubercula quadrigemina.

What then were the functions in the hemispheres which would not respond to electricity? To this the answer of vivisection was by ablation. Flourens, in an extensive series of operations on birds as well as mammalia, found that the functions in the hemispheres were those of psychic life — consciousness and volition; for consciousness, volition, and all psychic operations whatever were completely abolished after ablation of the hemispheres, while animal life remained complete, and the animals remained in a state of unconsciousness as if asleep, although capable of swallowing food by reflex action through the nerves, when food was put in their mouths.

In these functions of conscious psychic life which modern physiologists with their rude mechanical conceptions have been unable to reach or evolve, lie the great majority of the operations which are interesting to humanity as the source of our weal or woe, and not only the source of joy or misery, but the source of physiological and pathological changes by an indirect influence on the body.

It is pitiable to see all the talent and learning of the present century failing, after labors so prolonged and costly, and often cruel, to tell us much that is important of the functions of the convoluted brain, in which lies the science of man — *a vast magazine of knowledge*, destined hereafter to fill libraries with elaborate illustrations of that which collegiate science cannot even approach, because it disdains all psychic methods of investigation.

The failure of all investigations by electricity was due to the false philosophy which disqualified the inquirers. I have not found it impossible to excite and to reveal the functions of the brain by electrical methods. My first thought in this matter was to demonstrate the functions of the brain by galvanism, but after a few such experi-

ments I found the psychic and nervauric influences of the human hand so far superior that, looking only to truth and to science, I hastily laid aside the electric method as inferior (a mistaken policy) and never returned to its use until recently, presuming in my optimism that intelligent men would not fail to appreciate nervauric experiments with the hand. But a gross mind does not appreciate simple, unpretending truth. My experiments before committees were entirely successful, but no sympathetic chord responded in the minds of spectators. A materialistic age demands materialistic methods, and if I had appealed, not to the reason but to the senses, by an array of galvanic batteries and harsh experiments on hospital patients, the demonstrations would have resounded through the literature of the world, instead of meeting with immediate suppression. When the learned Dr. Samuel L. Forry announced at New York that my experiments were in their importance vastly superior to all that had been achieved by the most eminent physiologists, and the "New York Medical and Surgical Journal" which he established was ready to do justice to the subject, the peremptory threats of eminent physicians forbade its mention, and the death soon after of Dr Forry deprived the truth of a champion — a position which Prof Mitchell, after repeating my experiments successfully, was not disposed to assume.

I declined the use of the electric method, because that method is liable to evils and dangers from which the nervauric method is free, and because electricity is not commensurate with the psychic functions of life, although like other gross stimulants it may affect them, since it acts on the vasomotor nerves and secretions, and by changing the blood-supply affects the organs of the brain and is still better calculated to affect the brain, when in application to the body it stimulates regions to which the brain responds in sympathy.

The higher functions of the brain, which are not in direct correlation with electricity, are yet in close correlation with spiritual or ideal influences. A thought, or an external object which rouses a thought, will produce intense emotional action, which may produce violent excitement of the heart and muscles, and either greatly exalt or greatly depress the powers of life, or originate various forms of disease.

Psycho-vital power must be influenced by psycho-vital causes, and these are found in human beings whose psycho-vital force emanates from contact of the hand and from their entire personality. Hence the nervauric and psychic power must occupy a higher position in our therapeutics than the electric, and the scientific manual or psychic healer will occupy a more and more honorable position as society advances.

The psycho-physiological influence of the hand is of universal application, and the hand is therefore the chief agent in Therapeutic Sarcognomy, although in many cases the psychic energy of the operator may reach and powerfully affect the patient with therapeutic influences, independent of physical contact.

I do not deny that delicate electric influences may safely modify the action of the organs of the brain, for these influences, like caloric, affect the circulation and nervauric conditions, and through these means the organic action may be modified, but not in the prompt, wholesome, and natural manner which belongs to the hand, and which would authorize the general use or substitution of electricity in cerebral therapeutics.

The nervauric operator who aims to be a well-qualified, scientific practitioner should understand well the use of electricity as an important adjunct; and when in addition to this he understands the use of the materia medica, he may take rank as a complete physician and something more than a specialist.

Before proceeding further, I would ask, Is there any doubt thrown over my discoveries, of over forty years' standing, by the more recent experiments of European vivisectors, of whose immense labors it would not be improper to say that as to psychological discoveries the mountain in labor has brought forth a mouse?

I refer more especially to the experiments of Fritzch and Hitzig, who suppose they have discovered in the front lobes of dogs, muscular functions, although those functions are not in any degree affected by the loss of the front lobe.

Such investigations must be accepted in subordination to the well-established and undeniable truth that the functions of the hemispheres are psychic, and that muscular excitability cannot be commanded above the tubercula quadrigemina. Fritzch and Hitzig's experiments are supposed to show that muscular powers are associated with the frontal portion of the brain, as they claim to have excited certain muscles of the neck and limbs by applying the electrodes at certain positions of the frontal convolutions — the details of which need not be discussed at present. Taking the experiments as stated by them, they do not imply that any muscular power exists in the frontal convolutions, for all direct nerve motors are capable of rousing the muscles under galvanism after death, but the influence of the frontal convolutions ceased at death in their experiments.

As the frontal convolutions are known to be entirely psychic, and their excision does not in the slightest degree impair the muscular power, nor do their injuries affect it, it is evident that Fritzch and

Hitzig only stimulated certain psychic functions, which are *associated* with the control of the muscular system. But we knew before that volitionary impulses to certain muscles *originate* in the frontal or intellectual portion of the brain, and pass by the corpora striata to their destination. It is probable that the electric currents in their experiments affected the corpora striata by impinging upon the anterior expansion of the fibres of the striata, which would explain the different muscular effects they produced at different points, while the animal was alive, and their failure to produce any effects when they operated on posterior portions of the brain, not belonging to the radical expansion of the corpora striata. Their experiments are curious, but they do not disturb anything that we have heretofore known of the physiological and psychological functions of the brain.

I see nothing in the modern experiments of Fritzch and Hitzig, Ferrier and others, which is at all contradictory to my own experiments. On the contrary, I shall quote them as illustrative confirmations of my own experiments and discoveries. The movements produced by Dr. Ferrier were little else but the gestures of natural expression of the psychic faculties, easily explained by the laws of Pathognomy. These movements were easily produced, as all psychic action in animal brains is associated with muscular action much more closely than in man. For muscular effects the brains of animals are suitable, but for psychic effects we need the brain of man.

The nervauric healer should study very carefully his map of Sarcognomy, becoming familiar with the various localities, and should take every opportunity to verify them in the treatment of patients and in experiments on the well. A single person of highly impressible constitution would enable him to verify every locality and derive a large amount of instruction and entertainment from his experiments.

A faithful inquirer will have no difficulty in finding all I have found, and much more than has been stated in this volume.

To conduct the experiments properly, he should not select one accustomed to act as a passive mesmeric subject or capable of being controlled by an assertion so as to believe himself whatever he is told. The subject of experiment for scientific investigation should be in the best mental condition of clearness of perception, correctness of judgment, and independence of mind.

A very satisfactory mode of experimenting is to develop the local results independent of the personality of the operator, which may be done by heat and cold, by electricity, or by stimulating plasters.

Mild, gently stimulating capsicum plasters may be used — two inches by four, or three by six, or varied according to the object — and applied to the localities on each side of the body correspondingly. The effects may appear in five, ten, or twenty minutes, and the application may be continued for an hour or hours, which will make the results more distinct and positive. A valuable method of applying galvanism is by what has been called a Humboldt battery — two plates, such as silver and zinc, applied upon two localities of the skin and connected by a wire.

The continuous application of moderate warmth or of warm clothing upon any locality develops the local function, as the continuous application of cold depresses it.

All the effects which I thus produce by the hand, by local stimulation, by heat, or by electricity, have been experienced millions of times by intelligent people without attempting to look into their causation. They have been produced, also, millions of times in the practice of medicine without prompting physicians to look into the law of their occurrence, and every intelligent physician who reads these pages will find upon reflection that he has encountered many facts which illustrate the principles of Sarcognomy.

For example, who has not observed that antagonism between the head and feet which Sarcognomy explains — how coldness of the feet increases the determination to the brain, and excites wakefulness at night; how the warm bath to the feet relieves the brain and moderates fever; and how the heat and fatigue of the feet from overwork or prolonged walking deadens the action of the brain and reduces the mental power?

Who has not observed the dangerous effects of drafts of cold air striking the upper part of the back, depressing all the powers of life and endangering pneumonia or fever?

What physician is not familiar with the association between tenderness or pain at the lower end of the spinal vertebræ and the pelvic diseases of women; or the prostrating influence of abdominal affections; and the hopeful influence of affections in the upper part of the chest, and the alarming anxiety and fear caused by affections of the heart?

The stimulation of the brain by a slight hyperemia of the lungs, or of the bronchial region, which I have often experienced, was utilized by a British member of Parliament (Mr. Dunscomb), by putting a stimulating plaster on his chest when he had to address the House.

Who has not observed the substantial energy of the whole constitution produced by warmly covering the lower limbs, and the debilitating, injurious effects of allowing them to be chilled?

What woman does not know how closely her bosom is associated with her affections, so as to compel her to exclude from familiarity therewith all but her child, her lover, and husband? and what physician does not know the very intimate sympathy between the womb and the female breast?

All these sympathies and associations, as well as others less familiarly known, are explained by Sarcognomy as illustrations of a general law which applies to *every part* of the body, and shows exactly the psychic and physiological association of every organ and every portion of the surface.

The full exposition of this subject is not designed in this manual, as it would require an investigation of the history of all diseases, showing the parallelism between the phenomena or symptoms of all diseases and the laws of Sarcognomy — such as we see illustrated in affections of the brain produced by pelvic disorders, and in the peculiar hopefulness of consumptive patients, while the disease is doing its fatal work in the upper portion of the lungs. But an outline of the leading pathological illustrations of Sarcognomy will be given in the latter portion of this volume.

Nervauric treatment by the hand proceeds upon the principle that the hand whenever applied has an adhesive or attractive and stimulating influence upon the spot, developing and exalting its vital powers. Thus the constitution of the patient is roused to effect its own renovation instead of passively receiving the vital force imparted by the healer, as in the ordinary treatment, in which the patient merely receives what the operator gives, and the latter is often exhausted.

The hand of the operator has an attractive power, which is both psychic and physiological, and consequently attracts to the spot where it is applied the vital forces of the patient.

The psychic attraction of the hand is easily ascertained upon sensitives. If the sensitive subject stands before you erect and at ease, the application of the hands for a moment on the forehead, followed by gently withdrawing them, will produce a tendency in the head to follow the retiring hand. I do not consider it any objection to such facts that imagination may produce similar effects. The potentiality of tartar emetic is not refuted when we produce a similar nausea by imagination. In the majority of persons this would be imperceptible, but in the sensitives it is marked, and some will be so strongly attracted as to be unable to hold their place and compelled to advance. The most passive subjects will be entirely controlled, and may be drawn down upon the floor.

The psychic attraction of the hand is also realized in our friendly

salutations — the grasp of the hand being the expression of personal attraction or friendship. Mechanically the hand is also the instrument of adhesion, retention, or holding.

At the foundation of such phenomena lies the fact that the vital forces, emanating from the brain and chest in voluntary actions and unconscious influences, both physiological and psychic, must emanate from the surface of the body, if like caloric and electricity they have a real existence. Of these emanations all can recognize caloric, and sensitive persons recognize electricity and psychic influences. For these psychic influences we have at present no instrument of detection but the nerves of the sensitive, and for electric emanations of a delicate character there was formerly no test but the nerves and muscles of the galvanoscopic frog. But the skill of Dubois Reymond and others has furnished instruments of sufficient delicacy to detect the delicate electric currents of living beings and ascertain that there are not only electric currents in motor nerves and muscles, but certain permanent currents in the body proceeding from its superior portions downwards, as they do in great quantity and power in the Gymnotus or electric eel, and Malapterurus or electric shad. These currents are the product of vitality, changing according to the degree of health and vigor, and cease at death.

These "strong and constant currents," as they are called, are not thermo-electric but vital, proceeding from the positive head and chest to the negative extremities — the palms of the hand and the soles of the feet.

The negative character of the palms of the hands qualifies them to perform the part which they have always performed in my experiments — that of attracting and concentrating the vital forces and emanations of the subject, in which they coincide with the negative pole of the galvanic battery. Wherever I direct the hands to be applied for any purpose upon the body, the sponge of the negative pole of a weak galvanic or magneto-galvanic current may be applied with similar results — in some respects coarser and more powerful and dangerous* as a concentrative stimulus, but substantially similar.

*The powerful and even dangerous character of electric treatment, unskilfully applied, may be inferred from its effects as stated by the best authors. Althaus says: "The sparks from the common electrical machine, applied to the skin of any part of the body, produce a sensation of pricking and pain; if they are large the skin becomes red and a papular eruption, resembling lichen urticatus, is produced. If a continuous current be made to act upon the skin, a sensation of pricking and heat, redness, inflammation, and sloughing of the skin and subjacent structures may be caused, provided the current be powerful and the application prolonged. A volta-faradic current may produce sensations varying, according to its intensity, from a slight pricking to an acute burning pain; but although the tension of the current may be very high, it will not cause nutritive disturbances like the continuous current."

"If a continuous current of moderate power be directed to the skin for a short

In vital treatment there is more than the mere concentration of functions produced by negative electricity. There are emanations from the operator and absorptions of influence or general sympathy as in the old practice of animal magnetism.

It is true that in treating under the guidance of Sarcognomy the operator must part with a portion of his vital force to a constitution which is in a morbid state, but as he stimulates the healthy energies of the patient, the latter co-operates in the cure, and his co-operation relieves the operator. Thus if one by his combativeness rouses the hostility of one assailed, their mutual violence stimulates each to the highest energy; or if one diffuses humor and boisterous mirth in a company, the mirthful response assists his own gayety, and he feels very differently from what he should if he addressed a solemn group without a smile in response.

To pour forth hope, joy, love, or zeal to cold, unresponsive souls is an exhausting experiment, and to sit sympathetically in company with them produces more depression in ourselves than exaltation in them. The only way in which we can affect them beneficially without being injured is to go as a teacher or healer in the utmost tension of our powers, suppressing our impressible sympathy, while they are kept in a passive, receptive condition.

The patient, to be passive, should be in a sitting or lying position,

time, it dilates the blood-vessels and promotes circulation, but if it be applied for several hours successively (as is often done with Pulvermacher's chains and galvanic belt), the blood-vessels become paralyzed, and sloughs are produced. An induced current conveyed for a short time to the motor nerves and muscles rouses their vital energy; but, if its action be prolonged for an hour or more, the motor power of those organs becomes exhausted, and temporary paralysis may be the result."

"Static electricity, electro-magnetism, and magneto-electricity only affect that organ if applied so powerfully as to interfere with health and perhaps life; but a gentle, continuous current, directed to the face, scalp, or neck, and which causes no or scarcely any sensation of pain, is readily transmitted from those parts to the cerebral substance. . . . Sensations are caused by an application of the current to the head, which can only be owing to a direct action of it on the cerebral matter, viz., dizziness, giddiness, sleepiness, sickness, faintness, vomiting, and even convulsions. The latter phenomena are only noticed if the current be one of considerable power; but giddiness and faintness are often felt, even when a gentle current is used."

That electricity may be used in a safer and more congenial manner I do not doubt; but it needs important changes, both in electrical instruments and in the knowledge of the application of currents, to render it entirely satisfactory.

Unfavorable experience in the use of electricity from imperfect apparatus unskilfully applied, has led to such cautions as the following, given in Lincoln's "Electro-therapeutics:" "The duration of a single application should be rather carefully restricted, when one is using batteries of the usual strength. As a general rule, three minutes is long enough for application to a nerve, from three to five minutes to the spinal cord, from one to three minutes to the organs of sight and hearing. When muscles are to be stimulated, the time allotted to each will, of course, vary; if, for example, a whole limb has to be worked upon, it is necessary to shorten the time for each muscle, but for a single large muscle two minutes should be the utmost allowed; and for a group of muscles five minutes should suffice."

On the other hand, with the new apparatus and methods given to my pupils, no such limitations of time are required. Treatment may be continued for an hour or more, with effects entirely beneficial and unobjectionable.

the latter being better, and in the respectful, friendly, confiding state of mind which is necessary to his passive receptivity. The greater his reverence, love, and faith toward his operator the better the result.

The operator should be in the full tension of his powers — in high health, full of courage, hope, zeal, and joy. But he cannot maintain this state of mind, which develops his highest powers, under the most prevalent earthly influences. There is too much of difficulty, anxiety, and doubt; too much of jealousy, selfishness, and contention; too much of gloom, and moral as well as physical malaria, in the common experience of life to sustain the bright, joyous energy which should belong to the healer and the teacher.

True, he may go forth on some beautiful day when the atmosphere woos him with the bland warmth of its zephyrs and its well-vitalized purity; when the flying clouds, the waving trees, and the rich-tinted flowers pour into his soul a sense of the Divine beneficence flowing around him, and thus feel his better nature inspired and strengthened by an influx of joy; and hence I think the best triumphs of nervauric healing are in warm climates or in summer weather, and in pure, well-warmed apartments, where the moral warmth of the society is equal to the physical warmth of the atmosphere.

But the limited amount of such inspiring environment, and the large amount of gloom and of cold, moral apathy, as well as malarious and negative* atmosphere, in many places, render it necessary to have some other source of supply than the prevalent physical and moral conditions in which civilized society exists to-day.

We need a grand and continuous inspiration; and although I am speaking now of the healer, what I say is equally applicable to every reader, for all need to be sustained in health and moral power for the performance of duty and enjoyment of life.

We need an unfailing, ever-present inspiration.

WHENCE CAN IT COME?

and from what can it come? It must come from something which

* The atmosphere has positive inspiring conditions which vitalize the nervous system and invigorate all the secretions, and negative conditions which exhaust and depress vitality, injure the nervous system, check the secretions, and aggravate every disease. Electricity and actinism are concerned in these conditions, but scientists have not investigated this subject. They have not been studied in their atmospheric relations to the human constitution, and my own duties have not allowed me time to give this subject a proper investigation. The healing and restorative influences come from the sun. Hence they are more abundant in southern breezes, but are also found in the north winds which blow over a dry and frozen but sunshiny region. They are deficient wherever the solar emanations are absorbed by thawing or by evaporation, and abundant when restored to the atmosphere by freezing or precipitation. The deadliest conditions exist in the absence of sunshine and in prolonged evaporation and thawing. These varying atmospheric conditions affect not only the human constitution but the action of electric and telegraphic apparatus, the manufacture of sulphuric acid, the oxidation of phosphorus, and the decay of organic substances.

can inspire our hope, love, courage, and heroism. That which is to inspire our love must be supremely lovely and noble — that which is to inspire hope must be the landscape of futurity, bright with the sunshine of joy — that which is to inspire courage is the certainty of ultimate conquest over all evils and opposition. Where can all this be found but in heaven? In the boundless spirit world we have an eternity of life triumphant over all evil conditions — not a far-off realm, dimly perceived by a hoodwinked faith, hoped for against doubt, grasped at with the energy of dying despair, or enjoyed in passive melancholy, in the spirit of the poet who sings that

"Love and hope and beauty's bloom
Are blossoms gathered for the tomb."

The heaven to which we look for inspiration is neither remote nor shadowy nor doubtful. Our friends and relatives and ancestors are there; he who is now writing these lines may be there in less than a score of years, and some that read them will be there still sooner, and if you would look upon life, dear reader, with a large conception of its realities, you would realize how short, how very short, the distance between your present condition and the immortal hosts of higher spheres, who are soon to be your companions and who are your companions now when your finer, interior senses can feel and realize their presence.

The healer should be inspired — as Jesus was inspired, and promised his followers they should attain a similar inspiration and do similar works. Anthropology shows that they who live the heavenly life on earth do become inspired, and become healers, teachers, reformers, uplifters for humanity, by their moral power and enthusiasm.

How does this inspiration reach us? The method is simple and intelligible. The object that is capable of inspiring our love, uplifts, energizes, and beautifies our whole nature.

Men and women are never so happy, so bright, so generous, so heroic as when inspired by mutual love, and happy are they who can find an enduring, faultless earthly love to be an inspiration through life. The bright and faultless objects of perfect love are to most of us discoverable only beyond the river. If we look among the angels we find a perfect love — either some one whom we loved on earth, or some one who has risen to the sublime heights of love and wisdom by centuries of progress. Christendom finds its saints for love and adoration in the Bible, and some are well worthy of Divine love. But whether our love, or our adoration, which is the intensity of love, be given to Jesus, or St. John, or Mary the mother, or any of the army of saints from Moses to Joan of Arc, or from Joan of Arc to Washington, *the profound conviction of the nobility and loveliness of that which we*

adore is what calls out our love and gives us inspiration. Even if Jesus and Mary had been myths, the faith in their reality would have made them the inspiring power of Christendom; but, being realities, there was not only this inspiring power, but the inspiring influence of their actual spiritual existence. He whose best conceptions and spiritual capacities have been depressed by the physical wants and struggles of human life to a stern materialism, below the plane of being on which we can realize the supernal, should endeavor to substitute for confiding faith the power of a vivid imagination, forming grand ideals in his own mind, or allowing them to be evolved by romantic fiction and poetry, or by history and biography.

The worship of Jesus was not absurd; it was an adoring love for the qualities represented by him. The worship of Mary and of all the true saints was not absurd; it was a wholesome and inspiring *love of virtues* idealized in them. Worship often begins for men with the adoration of some true, noble, and gifted woman, whose worship deepens as she rises in the spheres, and this was the worship enjoyed by Auguste Comte after he had lost sight of supernal truth. Worship is but the most exalted love.

Beyond all these is the love and worship of the ineffable Divine, which no more interferes with or affects other loves than the love for the mother forbids love for her child. On the contrary, saintly love is the complement of Divine love, and both are the inspiration of that earthly love which extends to every brother, however unworthy he may be. Love on the earth plane is too often an unsatisfactory and thankless love, and is in danger of perishing in the cold, unless sustained by the warmth of Divine and saintly love, in which we approach something higher than self and are strengthened and ennobled thereby. For want of this how many a soul of noble powers, blind to the eternal beauty, has sunk into bitter misanthropy and scorn of all mankind.

It is evident then that the supernal world calls forth our love by its loveliness, our reverence by its grandeur, our hope by its assurance of happy immortality, and our courage by the assurance that we are not perishing worms of the dust, but partakers of a Divine immortal nature which cannot be crushed.

Inspired thus with the nobler emotions, the healer is brought into sympathy with the supernal love, and as *identity of condition implies sympathetic union*, he becomes actually inspired by the grand spiritual presence which from higher spheres flows into all who ascend to meet it. It may not be consciously, it may be simply an unconscious portion of his spiritual life, as all inspired sentiments are — as Ole Bull said that his music was inspired by the mountains of Norway, and Byron said "high mountains are to me a feeling."

But when the nervous temperament is favorable, when certain anterior interior parts of the brain are well developed, the spiritual power is not merely an unperceived support, but becomes an actual presence, and the attending, inspiring, or controlling spirit adds his power to that of a healing medium so generously as to relieve the latter of the burden, to give the intuitive diagnosis of disease, and to perform the healing work in giving spiritual vitality, which is so much more perfect, enduring, and inexhaustible in the spiritual spheres — the infinite sea of life.

Aided in this manner, the healer does marvellous works both in diagnosis and in healing; and the advent of this form of practice now, when materialistic philosophy has built up a mass of *physical science* concerning living bodies which rises like a Tower of Babel vainly seeking the skies, but which ever fails in exact diagnosis * and truthful prognosis in difficult cases and fails so often in therapeutic practice, — the advent, I say, of a higher form of practice in which spiritual power is concerned, demonstrates the blundering folly and laborious disappointment of human life in the scientific as well as the practical, when alienated from the supernal and spiritual, and the glorious elevation of every department of life when man is brought into nearer relations to the Divine.

The learned and eloquent Prof. Draper was the only physiologist of eminence who realized the necessity of rising above physical science into the spiritual sphere for that of which the colleges know nothing, which he expressed as follows, in his able text-book of human physiology: "We have precisely the same reason for believing the existence of the immortal spirit that we have for knowing that there is an external world. The two facts are of the same order. Of the future continuance of that external world irrespective of ourselves we entertain no doubt; indeed, in certain cases, as in those presented by astronomy, we are able to tell its state a thousand years hence. So long as our attention was *confined to statical physiology* everything connected with the subject now under consideration was enveloped in darkness, but it will be very different when dynamical physiology begins to be cultivated — dynamical physiology which speaks of the course of life, of organs, individuals, and races, . . . and then it will appear that the universal opinion of the ages and nations is not a vulgar illusion, but a solemn philosophical fact." It is to this dynamical physiology that I have given my life, and in which I

* Dr. Taft, who recently died at Hartford, Conn., was pronounced at the beginning of his professional life, by Dr. Willard Parker, incapable of living over six months, because one of his lungs was about gone; which opinion, being confirmed by a leading Boston physician, was universally accepted. Nevertheless, he lived to the age of sixty-four, and the autopsy astonished the doctors by revealing a pair of sound lungs.

have found the philosophy of the healing art. In a coming century the colleges will begin to learn its importance and know that the existence and operation of the soul are "not a vulgar illusion."

Hoping that the healer has attained the plane of true life and overflowing health which is beneficial to all who approach him, I would then caution him so to maintain his powers as to preserve his own health and efficiency.

In the first place, he should never enter the sick chamber in a hungry, thirsty, or enfeebled condition, or when exhausted by treating patients or the cares of business, for in such conditions he is predisposed to absorb the malaria of the sick chamber and the nervauric emanations of the patient, and has less power as a healer.

He should not expose himself to the physical emanations of the patient, no matter what his condition, for it will require all his energy to resist the vital pathological emanations that impress his sympathetic faculties. He should not breathe the air charged with the respiration and cutaneous emanations of the sick, but should have the chamber thoroughly ventilated before he enters it or have the patient brought into another apartment, and, if there is a current of air, should be on the windward side of the patient.

The best precaution for both patient and healer is to destroy the malaria of human transpiration and household emanations of various kinds by ozone. No costly apparatus is necessary. A small piece of phosphorus placed in a soup plate or saucer of water will slowly generate ozone enough to purify the air of an apartment. When we wish to increase the amount of ozone, we expose the phosphorus by tilting the plate or diminishing the amount of water, and when we wish to diminish the ozone we cover the phosphorus with water. The emanations of mint, thyme, cedar, and pine, and most of the odorous oils, have in some degree a similar purifying influence upon the air — none perhaps better than thymol. When a very impure condition is present, the diffusion of sulphurous acid gas by burning sulphur is an efficient disinfectant. Condy's fluid has been highly recommended by the medical profession as a purifying disinfectant.

In malarious localities, or in houses of imperfect plumbing and drainage, these precautions are very important. The best labors of the healer may be defeated by the insidious influence of impure air. Iron and its salts are the best convenient and harmless antiseptics to check the development of malaria, by sprinkling on the ground or in places where decaying substances are present. Sulphate of iron, chloride of iron, and iron rust are all valuable for this purpose.

Ozone is the natural purifier of the atmosphere, to which it owes its freshness in the forest and mountain heights. It is generated by

atmospheric electricity, and may be produced in our apartments by machines for frictional electricity. It may also be generated extensively by a mixture of three parts of sulphuric acid and two of the permanganate of potash.

A plethoric condition of blood-vessels is one of the essential conditions of health for all human beings and for animals. The less blood we have the more easily is our vital power exhausted, the more feeble and irritable are the nerves, and the more liable are we to inflammations, colds, fevers, and every other form of disease.

Abundant nourishment is especially necessary to the healer, and when attending feeble, emaciated patients he finds it necessary to eat much more than his ordinary allowance to generate vital conditions for his patients as well as himself. It would seem mysterious or incredible to the disciples of the materialistic physiology which prevails to-day, that without muscular fatigue or any special evacuation, the mere contact of the hands of the healer with his patient sometimes produces an exhaustion which requires to be supplied with food, and enables him to eat and drink more freely, as if he had been engaged in severe labor. But such is the fact, as I have personally experienced; and it proves that food is the means of supplying something more than mere organized matter — something which may be lost by vital transmission and radiation.

In the hungry condition, just before meals, the healer should abstain from treating his patients. His diet should be liberal and nourishing (adapted to his own constitution), and a cup of tea or coffee will often add much to his operative power and resistance to disease. In any difficult case he should use some congenial stimulus to exalt his powers and resist contagion. Absorption does not occur to any material extent when the blood-vessels are very plethoric; hence the free use of liquids, especially such as are of stimulating and tonic qualities, gives great protection against morbid contagions.

When any particular form of disease is prevalent, the healer would find it beneficial to use for himself as a prophylactic the remedies which that disease requires. In a malarious atmosphere, for example, two or three grains of dextro-quinine taken daily would give him a protection. In some cases he would even find it expedient to take himself the remedy the patient needs, for his own protection, or even to take enough to charge his constitution with its influence and give the influence to the patient by contact.*

Patients may be treated to any extent by external application on the skin of the remedies which they require, and if the operator

*There is nothing more efficient as a general antagonist to morbid atmospheric influences and contagions than the cimicifuga or *Macrotys racemosa* (common name Black Cohosh). It has been found efficient in resisting variolous infection.

should apply the required remedies on his hands, he would also find *that* a pleasant mode of making the required medical impression. The advantages of this course, in swallowing the remedies or using them on the hands, is the protection it gives the healer and its genial influence on the patient.

The healer should avoid the atmosphere of disease. His office should be *very freely* ventilated, and in visiting the sick chamber he should have it ventilated before he enters, and should not remain too long; but, above all, *he should not remain in a passive condition*, but should remain on his feet, either engaged in conversation and giving directions or in active manipulations upon the patient.

The first thing to be done in almost all cases is to make *dispersive manipulations* on the seat of pain or disease. The nervaura of the human body is not an imaginary thing; it is radiated and conducted in every direction; and when the clothing and atmosphere are in a very conductive condition, exhaustion is produced as in a moist atmosphere. The bracing effect of a dry, non-conductive atmosphere is well known. Metals are good conductors, and many a poor sewing woman has had her health seriously impaired by the metallic foot-piece with which she works her machine; many a writer has had his fingers and writing capacity impaired by the metal instrument used in writing, which would not have occurred if he had used the goose-quill, or a rubber, gutta percha, cork, or wooden pen-holder.

Non-conductors are necessary for our protection. Woollen and silk garments retain the vital conditions and produce a happy effect, different from that of cotton. Linen, as the best conductor, is objectionable in personal clothing on account of its conductivity.

The retention of nervaura in the brain by a silk cap has proved very beneficial in impairment of brain power, and the use of silk and woollen clothing is very beneficial to the nervauric healer.

That the nervaura may be beneficially retained or wastefully lost by our clothing is an evidence of its substantial reality, and every sensitive can feel its emanation from the hands and the various emanations from different parts of the body, or from the clothing.

In disease and pain we may proceed upon the theory that the nervaura of the morbid part is morbid, and should be removed. We frequently find that in manipulating upon the seat of pain, the pain seems to be propelled in the direction of our passes, and if not dispersed or scattered, moves along the limb, until at the extremity it departs. The first thing to be done, then, is to make dispersive passes lightly and rapidly to remove the morbid aura, after which the application of the hand produces a wholesome effect.

The nervaura of the operator's hand applied to the passive patient, all over the person, by gentle passes, or by gentle percussion, is a soothing, restorative influence, tending to resist the waste of tissues and vital forces, to diminish fever and excitement, and to promote nutrition and sleep.

In addition to these effects, it imparts the vital qualities of the operator's constitution, and, if he be well supplied with health, benevolence, and vital force, gives an increment of these to the patient. Hence a great deal of good has been done in this way in the practice of what is called animal magnetism, and the perception of the benefits produced by magnetizers has led the materialistic medical profession to attempt an imitation in their own clumsy, mechanical way, which they call *massage*.

If the blundering and ignorant practice of any art in disregard of accumulated knowledge is entitled to be called quackery, massage is a conspicuous example of quackery, or half-developed knowledge.

Ignoring all the wonderful cures made by magnetic healers; ignoring their experimental knowledge and practical directions, which have been so long published and so successfully acted on; ignoring the very existence of psycho-nervous influences and emanations, physicians demand a class of ignorant subordinates, mechanical rubbers, who operate blindly and often injuriously as well as inefficiently, Ignorance in the *massage* is not compensated by intelligence in the physician, for the latter, if faithful to the dicta and prejudices of his college and clique, has kept himself in wilful ignorance. Nevertheless the rubber, if intelligent, will soon find that he produces effects which physicians do not understand, and if honest in attempting to comprehend the treatment, he will learn something of what has been known as animal magnetism, and borrow from that something to render massage more beneficial. His healing skill will then be acceptable, cloaked under the name of massage. But I should be sorry to see any magnetic healer, for the sake of physicians' patronage, concealing his artistic skill under the delusive and vulgar title of massage.

Manual treatment consists in, first, dispersive passes on morbid parts; second, charging the system with the nervaura of the operator; third, stimulating organs by contact and percussion; fourth, changing the vital balance of functions by dispersing from one spot to accumulate at another.

Excitement accumulated at one spot may be dispersed by dispersive passes with the hand, by positive currents of electricity, and by sponging the surface with warm or hot water.

Excitement may be concentrated to any spot by the application of

the hands, by the negative pole of the battery, by the application of dry heat, and by stimulating plasters.

By these simple measures we call forth and regulate all the vital forces, rousing lungs, liver, stomach, bowels, kidneys, and the muscular system, and producing all the mental conditions necessary to co-operate in the treatment, when we understand the locations presented by Sarcognomy.

The advantage of treating the constitution locally according to Sarcognomy is that by this method the energies of the patient are specifically roused to aid in the treatment. There are certain controlling forces which when roused improve the condition of the entire constitution and respond to the purpose of the healer.

Thus as the operator stimulates each organ he rouses a beneficial response, and is not exhausted. If he stimulates the region of Health, he finds a healthful influence returning, which he enjoys and perceives in most cases by his sympathy.

To call out this reaction and stimulate the constitution of the patient to recovery, as it is stimulated by appropriate medicines, without exhausting the operator, he should not only know exactly what faculties and organs to rouse, but should rouse them actively, instead of passively. If he places himself in an entirely passive and sympathetic condition, with his hands resting on his patient, he absorbs the emanations of the latter, and becomes to some extent the victim of the contagion, so that his health is gradually undermined. Instead of the operator diffusing health, it is sometimes the patient diffusing disease.

By the active methods which I have recommended the operator repels the influence of disease, and by the knowledge of Sarcognomy he is enabled to produce the exact effect that is desired, which might be utterly impossible by any general operation, as when, for example, in a patient suffering from melancholy and hysteric conditions, cheerfulness and tranquillity are restored by placing the hands immediately under the arms.

But with all these precautions a sensitive healer will gradually absorb morbific influences from contact, sympathy, emanations, and the breath of his patient, and needs to be continually guarded. The experiments of Dr. B. W. Richardson and Brown-Séquard show that air which has been breathed is deprived of something necessary to life, and supplied with an unwholesome substance that is poisonous to animals when injected in their blood-vessels. I hope these warnings will not be neglected, but I know that physicians and healers habitually neglect themselves, and the approach of morbid conditions is so gentle and insidious that they take no alarm and find themselves

ill unawares. The only safe rule is to demand for ourselves complete, exuberant health at all times, and if there is any decline from that, to look into the cause at once, and remove it.

The precaution of washing the hands immediately after a treatment is a great safeguard, but where there is not much of the morbid influence each hand may be rapidly brushed by the other. If any medical or morbific influence enters by the arms, passes down the arms and hands may remove it, and after treating a patient a friend may remove from our constitution the deleterious influence by such passes, or we may make them ourselves. The devotees of rigid materialism may think this fanciful, but ample personal experience is a better guide than theoretic dogmatism.

A still more complete method is, after brushing the hands that have been on the sick, to place them on the well. Select some vigorous, healthy person, and place the hands for a few minutes on his shoulders, about the middle of the shoulder blade. This is the centre of health, and, if such a precaution were regularly observed, the healer, instead of losing health by treatment, might actually gain. This is the method which should be adopted in the prolonged treatment of a difficult case. The operator should have magazines of health at hand, and draw upon them freely. We may derive a still better influence from the top of the head or from the upper part of the chest from the neck to the mammæ. But there are some born healers who for many hours increase in power as they relieve the sick, developing their own vitality or drawing from their inspiration. If society were ruled by providential wisdom, such individuals would be consecrated to the healing art.

Another method which may be adopted in treating difficult cases is to have a healthful and vigorous person co-operate by placing his hands on our shoulders on the region of Health, and thus giving a sustaining power to resist and conquer morbid conditions.

I cannot impress too strongly on persons of a sensitive temperament the necessity of protecting themselves from morbid emanations. True, there are some whose vital energy and will enable them to repel morbid influences, but there are millions who are unconsciously injured; and the medical profession has greatly increased the disease and mortality from such causes by its *stolid materialism*, and unwillingness to recognize contagion through the nervous system. My own experience has been quite decisive, as my most serious disturbances of health have come from contact with the sick, and I have on that account never been able to devote much time to the practice of medicine. In Italy contagion is so fully realized by the people that it is not uncommon to destroy everything in the room in which

a consumptive has died. In England and America contagion is not understood. A family in Ohio, twenty-five years ago, were importuned by a consumptive in the last stages of life to take him into their house to die, and complied with his wishes, unconscious of danger. Their daughter waited on him until she became so sick she was forced to go away, and became a patient with similar symptoms. She had a strong constitution, but gradually emaciated, losing nearly forty pounds, under the consumptive cough, which has continued twenty-five years in spite of all that could be done, until in despair she called upon me, emaciated and feeble, for medical treatment. Had the family known the transmissibility of disease this misfortune might have been avoided.

The most permanent morbid impression on my own constitution was produced by attending, over thirty years ago, a severe case of fever and hepatic disease.

CHAPTER XI.

NERVAURIC THERAPEUTICS.

Impressibility the first question; its various external indications and causes — Influence of love — Improvement at the critical period of life — Test by the hand — Test by the eye — The receptive or impressible condition — The use of medicines — Impressible region of body — Passive and active methods — Influence of warmth, food, and medicine — Virtue the best foundation — Four controlling powers: health, brain power, vital force, sexual development — The shoulder — Plan of the human constitution — Parallelism of the spiritual faculties operating through the brain, and the physical powers displayed in the body — The psycho-dynamic health power; why at the shoulder; its proximity to the life centres; its connection with the spinal centre of power and ethical region of chest; its approbative character; relation to intercostal nerves — The foundation of Sarcognomy — Importance of shoulder exercises — The shoulder as a regulating region and centre — Treatment on the back — Narrow and exclusive views deprecated — Back to back practice — Fantastic theories and unscientific methods — Narrowness and prejudice — Importance of protecting the shoulders and back — Nature protects the vital regions of head and body.

In approaching a new patient the first question is whether his impressibility is sufficient to give a satisfactory response to our efforts, or whether he has the coarse, immovable temperament on which refined influences are wasted, and which we should willingly resign to the heroic treatment of cathartics, emetics, stimulants, narcotics, epispastics, and sudorifics.

The general appearance will usually be sufficient for those who have intuitive perceptions, but there are distinct indications in the delicacy of the skin, and the general refinement and softness of the person, no less than in the cranial configuration. The predominance of the brain in front of the ear assures us that its faculties are better adapted to receiving and appreciating impressions than to reaction and resistance.

All the anterior organs promote impressibility, as all the posterior resist it, but we are specially interested now in only one kind of impressibility, not the impressibility of the intellectual organs of the forehead, which receive knowledge through the senses and are therefore influenced by ideas, nor that of the genial and benevolent sentiments which respond to human worth and energy, but the impressibility which yields to subtle influences, to the subtle emanations of the nervous system.

This impressibility is associated with the breadth of the head at the temples, especially at the anterior part of that region of sensi-

bility which I discovered in 1837–38, and which has been forcibly illustrated by Prof. Ferrier in the cruel experiment on the brain of a monkey.

This region of Sensibility, at the basis of the middle lobe (now called the temporo-sphenoidal), extends from the back of the eye sockets along and above the cheek-bone to about an inch in front of the cavity of the ear. Its large development gives us acute sensibility to everything that can affect our senses, and the more anterior portion of the organ, possessing the more delicate and refined sensibilities, feels the influences that emanate from vital processes, and therefore is affected by them ; hence it may be properly called the organ of impressibility, above and anterior to which is the region of Dreaming and Somnambulism, an inch behind the external angle of the brow.

Breadth of this region is the best indication of impressibility, but delicate impressibility may exist without the breadth, for the organs which give breadth to the temples are concurrents or coincidents of analogous organs at the median line, on the same level, adjacent to the falx (separating the hemispheres), which may produce delicate forms of impressibility and intuition without giving breadth.

Moreover, impressibility may arise from a frontal temperament, produced, not by large frontal organs, but by the predominance of the front over a feeble occiput, and by a frontal life. As the predominance of the animal impulses in the mind and temperament may be produced by living a turbulent animal life among coarse associates, so a predominance of frontal qualities and frontal temperament may be produced by living according to the inclinations of the frontal organs — a quiet, amiable, indolent, but unselfish life, a sedentary life of delicacy, refinement, and social harmony — the effect of which we recognize in the general appearance.

The proud, heroic, and combative elements of character are antagonistic to this impressibility and tend to destroy it. Hence we do not find a great deal of it among the avaricious and jealous competitors for the highest rank and power. There is far more among the humbler classes, whose selfish passions have not grown strong by indulgence, and whose self-esteem does not interfere with a reverential esteem for superiority. It is far more abundant, too, among women, in whom the hostile, combative elements are generally kept in check, and who live generally under the refining (frontal) influences of home.

Moreover, Impressibility is especially favored by love, the exalted emotion which dominates over the life of woman as it does not over the life of man ; for love tends strongly to that intimate sympathy,

unity, and responsiveness which occur through Impressibility. (The *modus operandi* of this belongs to the psychic study of the organs of the brain.)

Hence the most perfect and interesting exhibitions of Impressibility occur among the most lovely and charming people. It is perhaps never absent when the sexual development first matures in young women. The period of refinement, romance, beauty, and poetic sentiment, when girlhood verges into womanhood, is the period of great impressibility, during which the magnetic touch of a mother or friend is competent to regulate all the delicate machinery of life, to ward off incipient disease, and guide the normal development of body and soul. But, alas, it is too often a period of mismanagement by the ignorance of the family and sometimes by the coarse blundering of drug practitioners, ignorant alike of the soul and the laws of its tenement—knowing only a scanty number of coarse medicaments, and reluctant to increase their number.

It is here that Therapeutic Sarcognomy will show its vast and beneficent power by making this transitional period not one of nervous disorder, habitual languor, and general inefficiency, or the initial period of grave and life-long diseases, but a period of mental brightness, for activity and development into permanent health and usefulness, whence a long line of noble posterity.

It must not be supposed that the strong and hardy elements of character are incompatible with impressibility because they antagonize it. The first individual in whom I discovered the extreme range of the sensitive faculties, Bishop Polk, was a man of strong character, and became a general in the Confederate army, in which he lost his life.

In addition to the indications of impressibility in temperament, sex, habits, education, and cranial development, we may observe indications in the face. A large eye with a *large pupil*, and a fulness or prominence of the cheeks around the eyes, with a rosy tint, are valuable indications, to which we may add a fulness of the upper chest, of the female bosom, and of the region at the lower end of the sternum.

But we may easily make a satisfactory test with the hands. Let the patient extend his hand horizontally, with the palm up, while we make a pass over it, the tips of our fingers coming within an inch of the surface of his hand. If merely sensitive, he will recognize the warmth of our hands and possibly a slight, very slight tingling or pricking effect. But if impressible, the nervauric emanation from the fingers will produce a slightly cooling sensation, similar to that from a very gentle breeze.

The individual in whom this occurs will prove impressible to the influence of the hand, and in many cases will yield so readily to nervauric treatment as to make the cure of his diseases a pleasure.

To illustrate further the degree of impressibility, we may touch the locality in the temples an inch behind the external angle of the brow, where we find Impressibility and Somnolence. While touching this locality on each side, a calm, dreamy feeling is produced in the subject, making him indifferent to surrounding objects, and presently producing a disposition to close the eyes. The upper eyelids droop, quiver, and wink, and gradually incline to remain closed. In the extremely impressible they will be closed so firmly as to resist the effort to open them.

The whole constitution is now in its most ductile or receptive condition, and nervauric treatment is sufficient for all its diseases. Yet the scientific operator who is familiar with the real value of medicines will still find it expedient to employ their assistance in accelerating and perfecting the cure, for medicines wisely adapted to the case are as congenial and wholesome as our common food. There is, indeed, no dividing line between food and medicine. What is commonly called food is the medicine for the hunger, thirst, and exhaustion caused by exertion and exposure. What is called medicine is the food for constitutions more than exhausted by adverse influences. Ferruginous and phosphoric preparations are the food for organs affected by degenerate or deglobulized blood. The coffee and wine which rouse from the prostration by heat and unwholesome air are as medical, only in a milder degree, as the quinine that resists malaria and the whiskey which saves the prostrated victim from the effect of the rattlesnake's venom.

As the object of the healer is success in controlling the constitution of his patient to remove his diseases, it is proper that he should aim to increase and maintain the impressibility upon which his success depends. Hence, if he initiates his operations by touching the temples until the eyes display the effect, he facilitates his subsequent labors.

I think it preferable, however, to produce the impressible condition on the corresponding sensitive and somnolent region of the body by placing the hand on the lower part of the chest, just below the sternum (breast-bone).

This operation, though not invigorating, is very valuable, as it produces a rather pleasant, passive tranquillity, especially as the patient should be lying down when it is attempted, which is indeed the best position for all therapeutic operations.

In consequence of the susceptibility thus established, the patient

feels the entire influence of his healer by coming into complete sympathy with him. The hand conveys his entire personality, and this operation alone would in many cases work curative results by subordinating the morbid constitution of the patient to the healthy constitution of the healer — producing by this simple operation results which the practitioners of animal magnetism aim to attain by a great variety of passes.

While I would recommend this initial process for the subdual of the patient, I must qualify the recommendation by the suggestion that it may sometimes be objectionable; for while it increases the susceptibility of the subject it tends also to increase that of the operator, and by his passive condition to make him receptive of the morbid influences of the patient. When these influences from a strong or extremely morbid constitution are too strong, the operator should not assume this passive condition. He may conduct the operation more actively, as by a gentle patting or tapping operation,* and produce the same effect as by the mere application of the hand.

What other influences, it may be asked, will increase the susceptibility. Warmth will contribute much; it draws the circulation to the surface, increases the susceptibility, and, if carried far, diminishes the muscular energy (which belongs to the occipital or resisting region and antagonizes the amiable elements). Hence warm climates have more than twice the susceptibility of the cold, and the nervauric healer who would win the greatest and most pleasant triumphs should visit the tropical regions, in which he will find almost the entire population subject to his power. In Mexico and South America the results will be far more brilliant than in the United States, and in India he will find the maximum impressibility, which was thoroughly demonstrated in the experience of Dr. Esdaile.

For this reason impressibility is greater in summer than in winter, and in warm apartments than in cold ones.

But the moral warmth is as necessary as the physical, and families ruled by love and harmony will not fail to develop susceptibility. Music also greatly promotes it, especially vocal music — so does the contemplation of beauty in nature or art, and habits of contemplation. There is a great deal of difference between the fashionable music, which is a mere combination of force and skill, and the music of feeling, like that of the Scotch, which has the best influence.

* The late Dr. W. McDowell (the first writer upon consumption who developed its philosophy and rational treatment, as far back as 1840) told me that an overseer in Virginia was accustomed to make a wager that he could put any one to sleep by force. To do this he would have the man seized by assistants and thrown upon his back on the barn floor, where he was held while the operator, by a steady and gentle patting on the epigastric region, would put him to sleep.

Diseases of an acute, active character generally promote susceptibility, and increase the sensitiveness to remedies, which explains the success of the infinitesimal homœopathic remedies, nicely adapted to the disordered organ. Yet many chronic diseases in which the nervous system is impaired rather diminish the susceptibility.

The influence of food and medicine upon susceptibility is worthy of attention. The sensitiveness and irritability of the nerves is increased by a low diet. Animal food tends to muscular development, which is antagonistic to the refining elements; vegetable food and fruits are more appropriate for the frontal and superior regions of the brain. Flesh diet and articles difficult of digestion antagonize impressibility, but articles which gently stimulate the frontal organs favor it.

Coffee, tea, and tobacco promote susceptibility, although their excessive use impairs the health, and medicines of the anodyne or nervine class have a tendency to promote it. There are many articles, such as coca, lavender, valerian, cypripedium, vanilla, etc., which, by their tonic and restorative influence, are beneficial to the nervous system, and thus indirectly promote a healthy susceptibility.

I think it will ultimately be realized that the predominance of virtue and refinement is the best foundation for impressibility, and I doubt not that in "the good time coming," when humanity shall have attained a nobler development, our entire population, even in cold climates, will become amenable to nervauric healing, and the aggregate vital power of society will sustain each individual against infirmity and disease by an all-embracing sympathy and friendship.

FOUR CONTROLLING POWERS.— The perfect development of the constitution into health and efficiency depends mainly upon four localities, in which the vital forces are concentred, which may be called the regions of

PERFECT HEALTH,
BRAIN POWER,
VITAL FORCE, AND
SEXUAL DEVELOPMENT.

The region of perfect health or normal perfection is at the shoulder blades, or superior posterior region of the chest.

This discovery carries us far away from all the crude philosophies and speculations of biologists. It is so great a departure from all pre-existing conceptions as to require some explanation to make it clearly intelligible to a philosophic inquirer.

Through long familiarity, the new philosophy has become to me a familiar and simple view of life, but in sympathizing with one who

dwells in the old forms of scientific thought, I perceive the necessity of giving an explanation of this new view of the constitution of man. I do not wish the therapeutic practitioner to know only the manual of treatment and the localities he must rouse, without understanding as well as practicable the plan and philosophy of the human constitution, which control his operations.

The fundamental plan is this, that every function of human life has a distinct local apparatus. There is no organ without a function, and no function without an organ. If we could determine *a priori* the functions of life, we should know what organs must exist. But the *a priori* method has always been a failure and delusion. We know nothing without observation and experiment. The existence of such a science as Sarcognomy has never been realized or ever imagined in human speculation, and the speculations of metaphysicians have only intensified ignorance of the constitution of man.

But this statement of functions and organs gives only a very limited glimpse of the truth; we find in the body a great many structures for the special purposes of physical existence, and in the brain a great many structures for the purposes of our spiritual existence. The brain powers are omni-relative — they face all possible aspects or relations of life, and qualify for all possible duties. They have no mechanical or limited character, and do not resemble the mechanical and limited functions of the body. Nevertheless, they control and inspire the body, wielding all its powers for their own purposes, and although there is so wide a difference between the genial and spiritual powers connected with the brain, and the special physical powers of the body, there is yet established by Infinite Wisdom a wonderful parallelism, unity, consociation, and co-operation, as if one were the echo of the other — not by any arbitrary decree and inscrutable fixedness of order, but by a marvellous unity of purpose and practical co-operation which enables us to find for every part of the brain a corresponding part of the body with which it sympathizes and co-operates in health and in sickness, the details of which co-operation are revealed in Sarcognomy, the science which shows the marvellous adaptation of all physical structures (apparently only for physical purposes) to sustain, obey, and unitize with the grand spiritual powers which in man typify the Supreme Creator.

The spiritual or psycho-dynamic power or faculty which we do not define but only suggest when we use the word Health is in the psychic sense the centre of our impulses, energies, and affections, so related that in its action it calls forth a harmonious combination of sustaining, impelling, and regulating powers, as has been already explained in the chapters on health and the spinal system.

Why is this power manifested in the shoulder, and why is the shoulder a suitable location for a response to the spiritual faculty of Healthy Animation?

The middle of the shoulder is adjacent to the great life centre in the chest, where the influx that sustains physical life by oxygen is in continual progress, and the efflux that bears vital conditions and nourishment to every organ of the body from the heart is also in continual progress, and the extent of these two processes is nearly a correct measure of the amount of physiological life evolved in the body. The large development of that region, and consequently of the posterior part of the chest, necessarily implies an abundance of vital action. Moreover, the shoulder, as distinguished from the chest, is an appanage of the cephalic region of the spinal cord, in which, as heretofore explained, is found the maximum vital power, and it covers the distribution of nerves from the cephalic region of the cord, which forms the brachial plexus, and gives the arms all their power. The shoulder stands between the spinal origin and the muscular and cutaneous distribution of these nerves, and the posterior or scapular region of the shoulder receives its (sub- and supra-scapular) nerves from the brachial plexus.

Thus the scapular region is associated with the highest vital elements of lungs, heart, spine and arms, and its development must indicate both power and activity. But in addition to this, the shoulder has an ethical character, derived from its proximity to and connection with the summit of the lungs and the corresponding portion of the spine. The summit of the lungs is an ethical region, the region that sympathizes with the superior aspect of the brain, the region of the virtues, and gives the upward determination to the vital forces. It is well known and often expressed in emotional language that the bosom responds to or is agitated by the higher emotions.

Thus the shoulder, in addition to its energies, is associated, by the law of correlation explained in the System of Anthropology, with the kindly emotions, and responsive to the love which belongs to the mammary region of the chest. The faculty of healthy animation, in the brain region to which the shoulder region corresponds, is the faculty which attracts affection by its abundant and harmonious exuberance of life, and which craves and wins love, which it seeks with approbative zeal. The word approbativeness is indeed almost an appropriate name for it, for it desires to be loved and continually seeks friendship and affection.

The adjacent organ, however, is called Approbativeness, because it especially seeks approval, sympathy, and admiration.

This health region on the scapula is on the line of the intercostal

nerves which from the upper dorsal region (its first five vertebræ) extend around the summit of the chest, supplying its integuments and the intercostal muscles — the integuments of the amiable region and the muscles of inspiration for the expansion of the upper part of the chest. As the anterior part of the trunk, like the anterior part of the brain, is distinguished by impressional sensibility, while the spine represents reactive energy, the middle of the scapula represents rather more of the impressional capability (which is necessary to the amiable character) than the spinal region, while it also represents the general benevolent or virtuous influence of the summit of the chest and brain.

Let us return now to practical Therapeutic Sarcognomy; for a complete demonstration of the *rationale* and *modus operandi* of the functions of life is not designed in this volume, and this *partial* illustration of one function is designed only to show the reader that Sarcognomy stands upon solid scientific foundations in anatomy as well as psychology, and is neither a matter of analogy and correspondence suggested by ingenious speculation, nor a crude result of careless experiments, but has been evolved by careful experiments guided by philosophic principles, and has been confirmed still farther during the last forty years by the test of its practical success in guiding the treatment of the sick.

As we find the centre of normal life or healthy energy in the shoulder — the centre which happily combines the pleasing, honorable, and attractive elements with physical efficiency, longevity, and conquest of disease, it follows that shoulder development should be a part of our hygiene, and that lifting, rowing, fencing, handling weights, swinging on the arms and other suitable exercises should be prescribed as an aid to our treatment, and that in the treatment the leading prominence should be given to shoulder methods.

Thus, in treating the various organs, we may keep one hand on Health while stimulating any other region, which will give a normal direction to each excitement and prevent it from going to excess. Under this influence from Health, medical treatment will have a genial effect, which otherwise might prove disturbing and irritating, and the little disturbing influences from lack of sympathy or congeniality or other petty annoyances will be overlooked or unfelt.

The same precaution should be observed in operations upon the head. One hand extended upon the superior posterior region which embraces Health will continually do good and regulate all other operations.

It may also be observed that manipulations or passes toward the region of Health will have a better effect than those in opposite or dif-

ferent directions, unless there be some special reason for the latter, as when downward manipulations are used to accelerate the action of the bowels, or disperse morbid conditions.

Invigorating passes should be made backward ; soothing and regulative, upwards ; stimulating or exciting may sometimes be made downwards, but these if continued long become exhausting and injurious. Such injurious effects frequently occur in electrical treatment. The tendency most favorable generally is backward and upward.

If the healer would approach a number of his patients, either standing erect or lying down, and administer vigorous passes from the hypochondriac or from the hypogastric region upwards and backwards, he would find that they all feel refreshed and invigorated, and like the operation.

I do not perceive any possible harm to arise from the continued and vigorous exertion of the health region. Yet in its highest energy it creates an abundance of vital and moral power which must crave a field of exertion and would rebel against the cramped situations in which many are found. It is here to be observed that as we descend the back the influence becomes more active, at the lower margin of the scapula assuming the character of Playfulness, and further down the self-reliant and gregarious impulses which would not be content with a quiet life. A more quiet influence is found higher up — a healthful serenity and fortitude being found at the top of the shoulder, as we find it at the summit of the head, vertically above the cavity of the ear, adjacent to the median line.

The sensitive, depressing, hypochondriac influences which are associated with the anterior margin of the liver and its vicinity, and which in diseases of this region display themselves in gloomy sensitiveness, are antagonized by the region of buoyant Fortitude, which lies between the side of the neck and the exterior aspect of the shoulder. Hence this region is disturbed by all affections or irritations of the liver, but not by its inactivity, And as this is the locality at which the suprascapular nerve proceeds from the superior portion of the brachial plexus (the portion which has the closest sympathy with the brain), this fact explains the pathological mystery that affections of the liver indicate their existence in many cases by a pain in the shoulder in the region supplied by the suprascapular nerve. The phrenic nerve, which communicates with the liver as well as the diaphragm, has commissural branches which connect with one of the nerves to the shoulder.

If the region of health be so important, the suggestion might arise that treatment through this region alone would be all-sufficient, and no doubt a successful practice might be conducted in that way, for the public, accustomed to the delays and failures of old medical sys-

tems, does not know enough to understand how much ought to be expected from a course of treatment, or how to distinguish rational treatment from that of pedantic ignorance.

The greater importance of the shoulder region, the spinal column, and the entire back should not lead us to neglect other regions. We should carefully avoid that common fault of narrow minds — concentration upon one idea or one method to the neglect of everything else. A successful practice might be conducted solely by treating the back of the trunk and the head, or applying tonic plasters upon these posterior regions, or even tonic metals.

In Boston some psychological healers have attempted to cure their patients by sitting back to back with the patient — a method which might have some effect in imparting vitality and health directly from one spinal column to the other. This method was associated with the theory of the nonexistence of matter, and of diseases being entirely imaginary. The absurdity of the theory is its greatest fascination. As there are persons who, when on the brink of a great precipice, are strongly impelled to throw themselves off, so there are many who, in the presence of a great mystery, or what seems to be such, are tempted to plunge into the deepest gulf of absurdity that is visible, as we see in some of the intensely absurd theological dogmas that have ruled the civilized world.

The upper posterior portion of the trunk — the shoulders and the space between them — being the tonic region of the constitution, all processes are invigorating which concentrate the vital forces to that part. Stimulating and tonic plasters are therefore beneficial on this region, and warm clothing has a tonic effect. The capes of the overcoat formerly in fashion were really useful; and the shawl is one of the most valuable of female garments, the use of which has been of great benefit to health and life. On the other hand, the chilling of the shoulder region is peculiarly prostrating to all the powers of life, and it has been maintained by some intelligent physicians that the chills ascribed to malaria were more properly attributable to the depressing influence of nocturnal cold operating on the shoulders.

When riding or walking on a clear night with a cloudless sky, the shoulders are exposed to the intense cold of the planetary interspaces (perhaps 400° below zero), to which they are giving radiation. Unless protected by an umbrella or heavy shoulder clothing, this is a dangerous exposure to delicate persons. Still more dangerous is it to sit at night beyond the shelter of the house or porch. But the injury is far less when the sky is covered with clouds, which reflect the warmth of the earth and shelter from the stellar region of cold, so that the earth surface is less cooled and there is less dew.

In accordance with these principles mankind generally understand that the back must be well clothed, and we are accustomed to speak of clothing as for the back, while we are accustomed to leave the coat open in front. A similar exposure of the back would be so injurious it is never attempted. The opening of the vest at the middle of the breast, even when facing the cold wind, is harmless, while the very same exposure between the shoulders would be dangerous —for the back is the tonic and the front the atonic region. The front receives impressions, and the back reacts and resists by its own spontaneity, sustaining a vital force which the front tends to expend.

Nature has carefully guarded the seats of vital force. It is the front of the head, as well as the front of the body, that faces the cool breeze without injury. The top, the side, and the back of the head, which are the seats of our vital forces, are well protected by hair. The front, the forehead, the seat of unvital and devitalizing intellect, is bare. So are the anterior parts of the temples and the upper part of the face, in which all the functions are non-vital or exhausting. The chilling of these regions may retard intelligence and pliability, but never injures health or life; even the loss of a considerable amount of brain in these anterior regions is not a serious affair for health or vitality. While the passive, sensitive, and yielding functions of organs behind the upper part of the face render them so unnecessary to vital power as not to require much protection, the organs covered by the lower part of the face are highly necessary to life, embracing, as they do, calorific, respiratory muscular, and digestive capacities, and hence the beard thickly covers precisely the regions which need protection; and when an intensely cold wind renders the warmest clothing necessary, a woollen wrapping around the lower part of the face and neck, where nature has placed the beard and hair, is worth more than five times the amount of clothing applied anywhere else.

Returning to our subject: the posterior regions of body and brain are protected by being in the rear and thus escaping collisions. Their life power, residing in the brain and spinal cord, is protected by the very strong bones of the skull and the spinal column. Hence the position instinctively assumed by the sick and infirm, lying horizontally on the back, gives great preservative and recuperative power by the warmth which it gives the spinal column, and the predominance it gives the brain, which is relieved from the tax of muscular effort, and has a better blood-supply in the horizontal than in the erect position. The advantage of the horizontal position is sometimes lost by those who, after lying on the back, turn on the

side without bringing warm clothing against the back to maintain its warmth. The importance of the spinal column is illustrated both by heat and cold. Very injurious and debilitating effects are experienced by those who stand in such a position that the back is continually exposed to the heat of a fire or stove. The cold shower bath and the ice bag on the spinal column are among the most powerful agenceis known in therapeutics.

The shoulder being the tonic and hygienic region, its extension in the arm necessarily partakes of that character; and the exercise and development of the arms must rank among the leading measures of hygienic culture, — a truth which is only recently beginning to be appreciated. The entire arm has a tonic correlation with the viscera of the trunk, the humeral region gives a fortifying energy to the viscera of the thorax, and the forearm to those of the abdomen. Hence arm exercises strengthen the visceral functions better than locomotion, and diseases of the viscera are effectively treated by warming and stimulating applications to the arm or by hæmostasis or hæmospasia on the arms, which is of marvellous efficiency; for hæmospasia, while relieving internal congestions, gives such a development to the vital force of the arms as energizes all the viscera. The organs in the brain which sympathize with the arms are tonic correlations of those which sympathize with the viscera, — a proposition, however, which is intelligible only after the study of Anthropology.

As we know the nervous system to be the seat of life and the measure of its development, we next proceed to consider the brain power.

CHAPTER XII.

THE OCCIPITAL ENERGIES.

Brain power and its location — Prior development of the brain — False doctrines corrected — Superior organs necessary to vital power in man — Brain power compared to Health power — Connection of the latter with Moral Power and conduct — Local treatment — Vital Force and sexual vitality — Locations of Vital Force — Its distinction from Health — Influence of Vital Force when roused — Its connection with Nutrition — Location of the latter — Its influence on the constitution — Importance to invalids — Treatment through brain — Digestion — Its connection with the spine and with the gastric region — Organ of Alimentiveness — Its depressing influence — Buoyant Fortitude — Its moral association — Fasting — Influence of Firmness pathognomically explained — Hunger and appetite — Best method of treating stomach — Physiological influences of Firmness and the shoulder — Gastric irritations and emesis — Gastric medicines — Proper manipulations — Region of assimilative absorption — Moral forces concerned — How to promote assimilation — Spiritual relations of this region — Intellectual and occipital influences — Retentive power of the latter — Relaxing power of the former — Contrast of the Adhesive and intellectual regions — Adhesiveness on the occiput and on the back — Combativeness, its location and influence — Importance of Adhesiveness to patients — Importance in society and business — Retentive influence of the back — Its explanation — Region of Business Energy — Effect of spinal injuries — Of repletion — Co-operation of the energies — Conservative and destructive agencies — Upper and lower part of the abdomen — Restorative influence of Adhesive region; its connection with Coolness and Sleep — Philosophy of the production of sleep, and the organs concerned in sleep and wakefulness.

Brain Power in Sarcognomy (co-operation of the body with the brain) belongs to the cephalic region of the cord. Why it is located there and how it operates were fully illustrated in the chapter on the Spinal Region.

The recognition of the brain and its co-operative corporeal region as the seat of life is a great step in the transition from the old to the new physiology. It is sustained, not only by the clear demonstration that life is an influx, which was referred to in the second chapter, but also by the priority of the formation of the brain in the earliest embryonic condition of vertebrate animals. In the earliest changes of the vitelline substance of the chick, the blastoderm exhibits a mucous and a serous stratum, or hypoblast and epiblast; from this latter are evolved the cerebro-spinal system and the cutaneous surface. Originating thus together they preserve a parallelism and sympathy which are illustrated in Sarcognomy. In the development of the cerebro-spinal system two dorsal laminæ rise up on each side of the primitive groove of the blastoderm and unite so as to enclose a chan-

nel for the cerebro-spinal system in which the brain and spinal cord are developed. In this development the cephalic end takes precedence in time, and is much the largest part, which shows the priority of the brain in development in connection with its primitive centres, the pituitary and pineal bodies.

When life is regarded as the product of chemical operations taking place all over the body, and the brain as merely an intellectual, conscious, and volitional centre, it appears rather as an organ of vital expenditure and source of weakness than as the seat and source of vital power. Hence we have been abundantly warned against extreme culture and mental precocity as endangering or consuming vitality, and illustrative examples have not been lacking. Education was thus made to appear a burdensome if not a dangerous affair for delicate constitutions.

Yet these notions were all scientific errors and practical mistakes The *proper* cultivation of the brain is the most efficient method of developing true life, health, and longevity, and by acting upon this principle I am enabled now in my 76th year to enjoy in buoyant health, vigor, and happiness the maximum capacity of my life.

The great mistake of most biological theorists has arisen from their ignorance of the true character of the brain, in which they recognize only what they are *compelled* to admit — intellection and the volitionary guidance of muscular motion, both of which are exhaustive operations expending vitality, while they perceive nothing of the great energizing powers of the superior and posterior regions. The mental development and excitement which are injurious to the young are solely intellectual, and when education is confined to forcing or training the intellectual faculties it is necessarily exhausting and injurious in its tendencies, of which all academic colleges and universities are today examples.

But the early development and power of the brain in its higher vitalizing regions, so far from being exhaustive or injurious, is the precursor of a noble and powerful manhood, and the evils just mentioned result, not from the normal, but from the abnormal, one-sided growth or culture, the premature development of the sensitive and debilitating faculties at the expense of the vital forces. The boy whose manly courage enabled him to play the part of a man in assisting his family, taking care of his brothers, managing the live stock on a farm or transacting business for his father, is really and substantially precocious by a normal development of the brain, and hence displays a manly vigor beyond his fellows, ending in an energetic and able manhood.

Brain power, the power that vitalizes and sustains everything, be-

longs to the region protected by the hair, and centralizes to the centre of the scalp, from which the hair radiates. It manifests itself in the strength of the voice, the power of the eye, the energy and impressiveness of the bearing, the vigor with which every faculty acts, and the power of endurance.

The action of the spinal cephalic region is somewhat more powerful but less harmonious than that of the Health region, and commands more respect than love or admiration. The Health region wins by a greater degree of sweetness, grace, and superiority to injury. How pleasing the thought that the most perfect enjoyment of life and efficiency are associated with the most attractive manners and the most faithful attention to our social duties.

It is one of the most interesting and instructive revelations of Anthropology that every departure from the proper line of conduct is a departure from perfect health and enjoyment, and therefore the more Godlike the life, the greater its internal rewards, although there may be suffering inflicted by those who, living on a lower plane, are a cause of unhappiness both to themselves and to others.

The virtue which is thus rewarded, and which is associated with the superior and upper posterior region of the head and trunk, is not the passive virtue which does no wrong act and cultivates unselfishness as the supreme purpose, but the active virtue which is ever energetic in discharging duties, in giving pleasure to all around, and exerting a wholesome, attractive, uplifting, and beneficent influence in all intercourse, while devoted and zealous in industry.

There have been many false and unnatural ideas of virtue derived from ancient superstition, such as the doctrines of Buddhism and the monastic Christianity of the dark ages, which have misled and are still misleading many good people into an unnatural and inefficient life, in which neither the practical energies nor the gay and cheerful social sentiments are developed. Such a life is not virtuous, but feeble and morbid.

The stimulation of the Cephalic and Hygienic regions would be enough but for the reason that the departures from health, being located in different parts of the body, need the direct assistance of the operator's vitality at each location in addition to the influence transmitted from controlling centres. Still it is a well-established though marvellous fact that influences may be transmitted from the soul and brain, which with supreme power dissipate the most calamitous and long-standing chronic diseases.

Two of the most important inferior regions for local treatment are those of vital force and sexual vitality.

Vital Force, situated on the summit of the posterior aspect of the

thigh, is not the perfect and satisfactory vital power which is found in the shoulder, but a similar power on a lower plane — a power displayed in the muscular system and shown by indomitable energy and restless activity, yet not so restless as the influence of the lower part of the thigh and the knee.

We find this vital force on the head, about an inch behind and interior to the lower end of the mastoid process (behind the ear), and its influence gives us a consciousness of physical power. I recollect how distinctly I felt it sympathetically about forty-six years ago, from contact with the organ in the head of an impressible subject who was a good walker — a feeling as if a walk of ten miles would be a pleasure.

The difference between the organs of Vitality, or Vital Force, and Health is, that the latter gives a full, harmonious development of character or personality, including physical capacity and endurance; while the former gives physical power alone, without sustaining health or firmness, and without moral government or character. Acting in predominance, it would give the desperate and hostile energy of the outlaw, whose crimes have arrayed the world against him. In this predominance it destroys the moral sense, and concentrates all the power of the brain and soul in the impulsion of the muscular system. Yet in the *normal* course of life the basilar forces of the brain do not run into such evils. On the contrary, each basilar organ seems to act as a radical power, sustaining the action of a higher faculty, as will be explained in my System of Anthropology. This vital force is antagonistic to the humane and tender sentiment which is most deeply interested in the condition of others, and which causes some persons to faint at the sight of great suffering or bloodshed.

In the invalid this power needs rousing, unless his condition be one of violence and passion, tending to insanity. The body being in an enfeebled condition, the spinal cord is not acting with proper vigor, and needs an influence descending from the brain, which is elicited by the organ of Vitality, for its line of action is directly downward. Under this influence the deadly languor of disease gives place to more natural feelings; debility is diminished; all the organs begin to act in a more normal way, as if they had received their appropriate medicine. The process of decay and dissolution is checked, and healthy nutrition is revived; for the region of NUTRITION is adjacent to that of Vital Force, and goes with it by proximity. In applying the hand upon Vitality it should be extended so as to cover the region of Nutrition or growth, which is situated a little more anteriorly, just below the head of the thigh-bone.

As one stands erect with his arms hanging by his side the wrist

falls upon the head of the thigh-bone (femur); if then the wrist be moved backward just behind the femur the palm of the hand would fall upon the region of Nutrition, the influence of which produces growth and improves the capillary circulation. This region being usually more developed in women than in men enables them to maintain their proper development and plumpness with a smaller amount of food, and to nourish without injury or loss the children whom they sustain during gestation and suckling.

A deficient development of Nutrition produces a tendency to emaciation, no matter how ravenous the appetite. Persons inclined to corpulence or *embonpoint* are often small eaters (especially females), their power of nutrition being so great that little food is needed.

A large development of the thigh (including the regions of Vital Force and Nutrition) serves to fortify against pulmonary consumption and nervous debility, and is usually associated with large development of the corresponding regions in the brain. Deficient development of this region produces delicacy of constitution.

The stimulation of the organ of Nutrition is very important in all nervous constitutions. The direct influence of the organ is soothing and comfortable; its ultimate effect overcomes the nervous condition which is mainly due to a deficient supply of blood, a deficiency which may be overcome by the organ of Nutrition, with the aid of good food, to which phosphates, hypophosphites, and a very small quantity of iron make an important addition, effecting the development of blood.

In the majority of invalids both Nutrition and Vitality need stimulation, and the hand can easily be applied so as to cover both. One may stimulate himself in these regions by applying the hands, and this application upon retiring at night or before rising in the morning will have an appreciable effect, as I have verified in my own person, although one is too much accustomed to his own personal aura to be as strongly affected by it as by the influence of another.

These localities on the body explain the very injurious effects of sitting on a cold stone or the cold, wet ground; they also explain the sedative effects of a very warm sitz bath and the energizing effects of a cold sitz bath so conducted as to promote reaction.

The effects produced at the summit of the thigh are satisfactorily produced also at the basis of the brain. Thus when the hand grasps the junction of the head and neck, covering the base of the cerebellum, a most beneficial, vitalizing, and restorative influence is diffused through the person, which is increased by placing the hand at the summit of the thigh.

The region of Nutrition does not embrace all the nutrient func-

tions of the constitution. There are three other influences to be considered — those of digestion, absorption, and tonic retention or resistance to dissolution.

Digestion depends upon the energy of the stomach, which is sustained by the lower half of the dorsal region of the spine, upon which the hand should be placed for its invigoration. In accordance with the general principle that power is located posteriorly, but excitement farther forward, midway to the front we shall find the hungry or digestive influence at the margin of the ribs on the side, a little in front of the middle line, and nearly on the level of the stomach. This corresponds with the gastric region on the head, in front of the cavity of the ear, which is really the organ of Alimentiveness, located by phrenologists heretofore higher than it should be. In stimulating this locality we assist and accelerate digestion, producing, if continued sufficiently long, a feeling of hunger. This feeling, the product of the Alimentive organ, is more depressing than stimulating, if prolonged, and tends to produce gloomy, selfish, and irritable feelings. Hence every one knows that it is not judicious to seek favors from any one when he is hungry. The explanation is that the Alimentive organ is in the midst of the group of selfish, gloomy, and indolent feelings. Hence, whenever it is overactive, whether from hunger, dyspepsia, gluttony, drunkenness, or noxious, nauseous, or poisonous ingesta, it greatly lowers the vital forces and moral energies. One attains his maximum energy only after the irritation of hunger is relieved by food, and the gastric action roused by the food has subsided, from its digestion, when the buoyant energy caused by the addition of nourishment to the blood antagonizes gastric action and the stomach ceases to disturb us.

Buoyant Fortitude is the character of the region which antagonizes Alimentiveness. This is developed by a state of repletion which gives nourishment to the brain, as we find after the enjoyment of good food and drink. But it is developed also by the moral causes which energize the upper region of the brain. The resolute purposes of heroism in war or struggle of any kind, and the lofty enthusiasm generated by religious, philanthropic, patriotic, loving, and conscientious emotions, or even the earnest application of study, will so energize the firm and buoyant regions of the brain, as to arrest gastric action and destroy entirely the desire for food. Thus many persons in the zeal of study or labor reduce the stomach to such inactivity as to lay the foundation for dyspepsia.

Under great moral or religious excitement fasting is natural; but the attempt to enforce fasting as a ceremony, when it is not prompted or sustained by any religious or earnest emotion, is only another mode

of irritating the stomach and increasing the amount of demoralizing animality. Such fasting, however, harmonizes well with the gloomy theology which dwells upon the prospect of eternal misery for our fellow-beings.

The influence of the higher emotions in controlling the hungry gloom of the stomach and sustaining our buoyant vigor is explained by PATHOGNOMY, which is the mathematical key to Anthropology, and will require a special volume for its elucidation.

Pathognomy illustrates the law of linear direction which *governs all life in all worlds.*

The pathognomic direction of the region of Firmness, in which it nearly coincides with the whole moral region, is upwards, drawing vitality and circulation toward the brain and the shoulders.

In accordance with this influence the red blood ascends by the aorta, the carotid and vertebral arteries, to the brain, developing its maximum power and the power of the spinal cord ; and the thoracic duct, starting from the level of the second lumbar vertebra, comes upward for about twenty inches, carrying nearly ripe blood, the chyle, to the subclavian vein, and thus removing the depression which is the cause of hunger. The chyle is thus carried up to the corporeal region of Firmness and Fortitude.

This strong volitionary influence is absolutely essential to health. Whenever, through the opposite elements, fear and despair, this upward influence is checked, the countenance becomes pallid, the brain has less circulation and loses power, the features droop, the person is impoverished in spite of food, the thoracic duct carries up little nourishment, life withers away, and sometimes even the scalp is so paralyzed and changed that the hair turns gray or white from a night of terror. Life declines whenever Firmness and Hope are diminished.

The hunger which belongs to the organ of Alimentiveness is not an invigorating impulse *per se*, being distinct from the eager desire and impulse to take food which belongs to the posterior portion of the brain on the same level, and above and on the body is found farther back and higher up. Hence in treating the affections of the stomach, the hand should be extended upward and backward in the direction of the ribs to the lower dorsal region — the Alimentive location being used more to rouse from inactivity than to give vital power. We may have from the posterior influence a vigorous appetite without any of the depressing feelings of hunger, or we may have from Alimentiveness the depression of hunger without much appetite or efficient digestive capacity. We are far below the standard of health when such a condition can arise, or when any loss of a meal or irregularity of diet can produce much depression.

This vigorous desire or impulse to take food, which our cerebral science locates on the occiput, corresponding with the dorsal region, was detected by Ferrier in experimenting on the monkey and finding that the ablation of the occipital region left the animal indifferent to food.

The depression from hunger is resisted in the region of Firmness and Health, which should ever predominate over the sensibilities and appetites. The portion of the firm region which is on the median line (or sagittal suture), vertically above the ear, and on the shoulder adjoining the neck, is antagonistic to the excitability of the heart and gives a feeling of fearlessness. The portion about an inch from the median line is antagonistic to the excitability of the liver and stomach, and hence resists the hypochondriac gloom of the hepatic region and the debilitating gloom of hunger. This buoyant influence we find on the shoulder, behind the middle of the upper surface, between the neck and the acromion process or prominent angle of the shoulder. Hence this is the region to antagonize hunger and the gastric irritation of dyspepsia, which produce the selfish and boorish ill-humor so conspicuous in Carlyle, the famous representative of the moral tendency of gastric irritability. But Carlyle is not the only conspicuous example of literature empoisoned by the unhealthy influences of a diseased or depraved body.

If we stimulate the region of buoyant Fortitude by the hand or by a plaster, we relieve the gastric irritation, but there may be materials — vitiated secretions or undigested food — which maintain the irritation, and which, to facilitate our success, should be overcome medically, as by an emetic or a peptic anodyne. A simple emetic of warm water, which may be made more effectual by adding one or two teaspoonfuls of the tincture of lobelia, or ipecac, and at the same time more soothing by stirring in enough of slippery elm to make it mucilaginous, will unload the stomach in a healthy manner. Milk will answer for the same purpose. An extemporaneous emetic is frequently prepared by adding mustard and salt to a glass of warm water.

Soothing and antiseptic agencies may be used to control the contents of the alimentary canal, or to soothe and protect the stomach after they are ejected. For the soothing and removal of irritation, one of the best articles is the *Scrophularia nodosa*, or fig-wort — an article the U. S. Dispensatory says is "very little used," and the gastric virtue of which seems to be entirely unknown to the medical profession. Half a teaspoonful of the fluid extract may be repeated hourly until relief is given. Ten or twenty grains of the bisulphite of lime or bisulphite of soda in a cup of water will counteract decomposing or fermenting conditions.

If acid be present, ten or twenty grains of calcined magnesia, bicarbonate of potassa, or bicarbonate of soda in solution will serve to neutralize it, or it may be neutralized by milk.

It will be expedient to accelerate the restoration of a feeble stomach by twenty-drop doses of the fluid extract of *Alnus rubra* (or tag alder) with which the scrophularia would favorably co-operate in controlling irritations. Ten or fifteen drops of the tincture of angelica, repeated if necessary, will make an efficient gastric stimulant. I have made a preparation of the flowers of the dandelion (*Leontodon taraxacum*) which I find an admirable assistant to digestion. The very pleasant liquid preparations of Lactopeptin by the New York Pharmacal Company make an admirable assistant to feeble digestive powers. Medical treatment is not within the scope of this volume, but I think that an enlightened healer should beware of the narrowness of mind which confines itself to a favorite class of agencies, and should master as far as practicable the vast and powerful resources of the materia medica, with which he can expedite and complete his cures, and do justice to a class of patients who cannot afford to pay for protracted nervauric treatment. Hence I make a few suggestions of medical remedies.

Gastric troubles may be truly dyspeptic from the irritation of the nerves and concentration of excitement at the stomach, or they may be apeptic from the lack of action in the stomach. In the latter case the Alimentive region may be excited on the body and on the head; but in the former case some dispersive passes are necessary to remove irritation, and the regions of Fortitude and Health should be excited to suppress the gastric trouble, while the lower dorsal region is used to give gastric vitality.

In addition to the regions of nutrition and gastric energy, a proper nourishment requires the process of assimilative absorption, for want of which digestion fails in its purpose and Nutrition has but an imperfect supply of material. The region of Assimilative Absorption on the body is immediately around and above the umbilicus. The application of the hand at this locality produces the tranquil feeling, favorable to rest and sleep, which belongs to assimilation. In applying the hand here we cover the absorbent region or mesentery and the course of the absorbents to the origin of the thoracic duct, the common receptacle of chyle at the second lumbar vertebra; also the jejunum, the chief source of the digestive supply of chyle, the duodenum, pancreas, colon, and lower portion of the stomach. The energy of this region, with its hundred and fifty mesenteric or absorbent glands, effects the final preparation of the chyle and its propulsion on its upward course to join the mass of our blood through the subcla-

vian veins which convey it to the right side of the heart to pass through the lungs before it mingles in the general circulation.

It is obvious therefore that a failure in assimilative absorption would interfere with the results of digestion and nutrition. In many cases, no doubt, this failure of assimilation is due to the failure in the moral forces, or mental depression. There is a tendency to emaciation and degeneracy in inferior characters. Criminals are generally of an inferior physique. Dramatists contrast the lean and hungry conspirator with the good-natured, plump, and contented citizen. Amiability promotes nutrition by assimilation. "Laugh and grow fat" is an old saying. Amiable and contented animals fatten easily, and give milk abundantly, while the fierce carnivora are remarkably lean.

Thus we see there is a close association between the amiable elements which cause us to love and assimilate with all nature, and the physiological powers which assimilate and accept the material that is brought us. The assimilative is in fact an amiable region, and has an amiable influence upon the character while it is operative. The upper half of the abdomen is an amiable region, for the entire abdominal surface corresponds with that of the face — the region of expression. The upper half corresponds with the upper portion of the face, lying above the angles of the mouth, and the lower half corresponding with the lower half of the face, which expresses the lower half of the brain, associated with lower impulses. The region immediately adjacent to and above Assimilation is one of amiable impressibility and yielding sympathy,* which as we pass upward merges into that of somnolent, somnambulic, sympathetic, psychometric, and clairvoyant conditions, of which there is abundant evidence in the records of animal magnetism, which prove the possibility of clairvoyance from the epigastric region.

The region of Assimilation therefore must not be overlooked in treating the general constitution and the digestive functions. It promotes impressibility, amiability, and healthful repose, bringing the subject more fully under control, into sympathy with the operator, and promoting restoration by nourishment, for which purpose the patient should be in the horizontal position, lying on his back, when this region is exerted, to facilitate the progress of the chyle in the thoracic duct by a horizontal instead of a vertical course. The application of the hand from the end of the sternum to the umbilicus is one of our most soothing and beneficial operations.

* This is, no doubt, the foundation of the old scriptural expression, "bowels of compassion." The seers intuitively felt that there were tender feelings in the gastro umbilical region.

The assimilative tract is one of healthful tendencies. The ilium with its Peyer's glands is frequently involved in disease, not only in fevers but in consumption and in cholera. Disease is less frequent in the duodenum and jejunum. Brunner's glands in the jejunum are remarkably free from disease.

Hence the absorbent region is very appropriate for stimulation, and does not so frequently require dispersive manipulation as the region below the umbilicus.

It is probable that the assimilative or umbilical region has more extensive relations to psychic life than those involved in the absorption of chyle. The umbilical region is the seat of the original mysterious influx of life through the womb, which is the connection with our ancestry. This changes after birth into absorption from nature, instead of absorption from the maternal constitution. It is along the umbilical chain that we trace the continuity of the human race back into the darkness of the uncounted ages, in which by influx and evolution man has been brought to his present condition, — the process of gestation being probably a surviving type or analogue of the creative evolutionary process of the over soul of the universe.

I regard the umbilical or assimilative region as having in the brain and soul important spiritual functions and relations, especially as to personal sympathy, attachment, and spiritual influences, but at present we are considering merely its relations to nutrition, development, and health. The associative faculties which establish the most intimate sympathy and union between any two persons lie along the median line.

The mouth, which corresponds to the umbilicus, is, like the latter, a channel for the influx of developing nourishment and also of oxygen, and as the umbilicus is the link of intimate union between mother and child, the channel of absolute sympathy and love, the strongest love that is known, so is the mouth the organ that expresses our attachment in the kiss. The kiss is the full expression of conjugal love, and may be a very efficient means in nervauric healing. Some are accustomed to impart their healing power by breathing upon the affected part. I believe they are not mistaken, as the breath comes from a beneficent region of the body, notwithstanding the assertion of Brown-Séquard that it conveys an element which is toxic in hypodermic injection. The contact of the lips is a healing agency. The dog for a similar purpose uses his tongue; but no such measures can be compared for beneficent effect to the influence which proceeds from the top of the head.

Besides Nutrition, Digestion, and Assimilation, there is yet another important influence on human development — that which consolidates

and holds together the materials gathered in by digestion and assimilation, and precipitated by Nutrition. That influence we find in the back — in the region antagonistic to the intellect.

To understand this philosophically we must know that the intellectual faculties tend to carry man out of himself and destroy his individuality by merging his consciousness in his environment, or in the thoughts of others. When they plunge his mind into his physical environment by perception and sensation, they lower his nature more effectually than when they carry him into the sphere of spiritual truth and philosophy. But they necessarily impair his physical energy, weaken his desires, unfit him for achievement, and relax both physical and mental fibre, in proportion to their *predominance*, which has very different effects from mere activity.*

The impairment of vital force by intellectual predominance renders the tissues softer and less compact, more inclined to disintegration, and less capable of sustaining a robust manhood : such is the effect of excessive schooling.

We must, then, rely upon the influences antagonistic to intellect for the preservation of vital force and compactness. The discovery of these influences was a revolution in Psychology. They belong to that portion of the occiput which antagonizes the organs of the forehead, and, as to the body, they are found upon the middle of the back, below the shoulder blades. They may be distinguished as the Adhesive Group — the group of organs of which Adhesiveness is the centre — organs which desire to keep everything fixed, as the intellect desires change or progress.

The Adhesive region, a region of desire and impulse, is interested in that which is personal to ourselves, local and limited — the intellectual in that which is impersonal and unlimited. The intellectual region is interested in all humanity alike — the Adhesive region in our friends alone. The intellectual region avoids action, enterprise, and responsibility, it is at home in solitude — the Adhesive region seeks to be actively engaged in the midst of society and exerting an influence. The intellectual region produces delicacy, sensibility, and inactivity — the Adhesive region produces impulsive energy and ability to interest others. The one is passionless and feeble — the other highly emotional and strong. One is exhausted and broken down by social responsibility — the other is spontaneously energetic, will not endure solitude, and continually gains power or influence in

* Some of my reflective readers may doubt whether the intellectual organs have this debilitating effect, because they associate intellectual action with the energies of character that impel it, but *mere* intellectual action is of a passive nature, as when we are listening to a teacher.

society. One develops in solitude, the other in stirring life. One exhausts and emaciates in action, the other grows and strengthens.

The latter is the tonic and vitalizing element which resists the disintegration of the body by exertion and by fever. It is the element to which quinine and other cinchona preparations appeal, in opposing the decomposition of fever, in doing which they resist the intellectual element so effectually as sometimes to impair the hearing, the memory, and the vision.

This stirring, active power holds every faculty ready for social relations and thus gives an attractive vitality to the whole person — a tonicity which resists exhaustive and malign impressions. The word adhesiveness expresses the physical as well as spiritual character of the faculty. It resists the waste of our physiological and spiritual elements, as Acquisitiveness resists the waste of our property. Hence it gives compactness to the person, and, by retaining the organized elements longer in the body, brings them to a higher vitality and perfection. Thus it becomes the tonic supporter of the physical development, giving to the character and the person the qualities that are interesting or attractive.

Hence we find it desirable to stimulate the Adhesive region to perfect the nutrient processes and enhance vitality. This region we find on the lateral part of the occiput, above and behind the ear, and on the body below the shoulder blades, occupying nearly two hand's breadths downward. Adhesiveness is the social or gregarious faculty, and social gatherings prompt to feasting and drinking.

Lower upon the occiput and upon the back we find the still more energetic and tonic element of Combativeness, which gives great energy to the muscular system, but which tends to give the muscular system a predominance over the cerebral, and the evil passions over the friendly emotions. From Adhesiveness upward on the shoulder the influence becomes more pleasant, tending to give the brain and moral nature a predominance over muscular growth and physical force.

Adhesiveness, lying between the two, assists both the moral and physical forces, as we see it in women sustaining the family relations and in men sustaining personal attachments, gregarious life, national unity, and co-operation in war, as well as sectarian and partisan co-operation in peace.

The many important influences of the Adhesive region should teach us the importance of rousing it in our patients, not only by nervauric treatment but by social enjoyment. The loss of society greatly impairs the vigor of the constitution, especially in those who are very adhesive. Solitary confinement is a cruel and depressing

punishment, and an enforced solitary life, or life without friends, impairs the general energy and even the vigor of the digestive organs. The indulgence of the social impulses, whether in amusements or otherwise, is the restorative power which many need to revive their health ; and it is the rupture of the social attachments which so often breaks down the vigor and usefulness of young soldiers, bringing on what is called nostalgia or homesickness. Disappointments in love leave similar effects on women, lowering vitality and impairing the action of the heart. Grief for the loss of friends and members of the family circle often breaks down the health of mothers. When health is thus impaired we should offer the balm of our sympathetic interest and seek to interest the sufferer in new social attractions. All the excitements of active life — business, travel, and social pleasure — address Adhesiveness: hence their restorative power. The relation of Adhesiveness to society and business is that of a steady motor power and tonic, preventing us from being discouraged or indifferent, and contributing material assistance to the unconscious processes of organic life. It is a great fountain of spontaneous impulse.

The fulness and rotundity of the back are important to the strength and retentiveness of the constitution. The rounded back, which is more conspicuous in the hog than the ox, and which reaches its maximum in the camel and dromedary, is associated with greater retentiveness and ability to sustain life upon smaller quantities of food.

The location of Adhesiveness on the back is on the lines of nerve distribution from the lower dorsal region, which, as already explained, controls the digestion and assimilation of food internally by the ganglionic nerves, while it braces the abdomen by the abdominal muscles, and thus not only assists by mechanical propulsion the processes of digestion and assimilation, but braces the trunk by the action of these muscles, as it must be braced for any vigorous exertion. The compression of the abdominal viscera and expulsion of the dark venous blood contained greatly increase the general energy.

Thus does the Adhesive region carry out its energizing influence and its attractive and assimilative nature, which gives to the adhesive the power of attracting and interesting friends — the quality which is called magnetism from its analogy to the action of the magnet.

We now perceive that the Adhesive region or middle of the back should not be overlooked in nervauric treatment. It extends across the back behind the arms on the level of the lower half of the

humerus (upper arm), or in other words below the shoulder blade. Its middle portion, along the spinal column, has a more positively energetic and muscular influence, sustaining general activity, and may be properly called the region of Business Energy, which sustains an active life. These explanations make it apparent that affections of the lower dorsal region must impair the digestive powers and the general energy — the blind energies of the animal nature opposed to the intellectual. Hence injuries impairing the spinal power, which disqualify for active life, are frequently accompanied by a predominance of the intellectual faculties — by wakefulness, clairvoyance, somnambulism, and spiritual phenomena, as in the famous case of Mollie Fancher, of Brooklyn; while on the other hand an overload of food, which taxes the dorsal region, interferes very seriously with intellectual action and energy, and the soundest sleep is obtained by resting on the back so as to keep the Adhesive region warm.

It is now apparent that the Vital Force and Nutrition at the posterior summit of the thigh co-operate with Business Energy, Adhesiveness, Alimentiveness, and Assimilation in the middle of the trunk, and that all are needed in restoring the invalid.

The tonic character of Adhesiveness as a conservative and retentive power, alike in physiology and psychology, is illustrated by its immediate proximity to the region of Coolness, just behind the arm on the side of the chest. Coolness is pre-eminently the conservative influence which forbids decomposition and combustion. Cold is antiseptic as heat is putrefactive in tendency. Coolness produces muscular firmness, as heat produces muscular relaxation. The calorific region of the body is that of dead, decomposed matter — the hypogastric region.

The Adhesive, associated with the lower dorsal region, presides over the inception and preservation of dead substance, for vital purposes, by the stomach and absorbents. The secretion of the stomach is acid and pre-eminently antiseptic, while the lower intestines have the alkaline condition which is favorable to decomposition. Their inflammation produces the maximum of fever, but the inflammation of the stomach has so little febrile intensity that the pulse is very feeble and the limbs dry and husky. Thus the stomach is associated with the superior half of the brain, which is cool and conservative, and it manifests this conservative character chiefly when Adhesiveness is well developed.

The Adhesive region (at the waist), which we have considered in its conservative, tonic, and anti-intellectual character, attains its maximum antagonism to the intellect adjacent to Coolness, behind the arm, where it antagonizes Consciousness, the vital centre of intelli-

gence (in the centre of the forehead), and thus suppresses all intellectual action and enables us to recover from the exhaustive influence of continued consciousness or intense thought.

This is a restorative influence needed for about one third of every twenty-four hours, and is therefore of the highest importance to health and the vigor of the nervous system. Hence the production of sleep is a very important part of nervauric treatment.

To produce sleep by operations upon the brain and body we should be guided by a correct organology. Sleep is a condition of diminished circulation and activity in the brain. The greater portion of the cerebral organs and faculties tend to develop increased activity, while other organs associated with animal life tend to diminish mental activity and sustain quiet physiological processes The superior organs give predominance to the action of the brain, and the basılar give an energy to the body which causes a very active circulation by increased energy of the heart and the respiration But there are special functions, not related to the active muscular system, which moderate all these activities, and it is as necessary that we should have the power of arresting our activities, which would exhaust and destroy, as to have the power of using them. This is effected by the visceral and nutritive system of the body and its controlling organs in the brain.

The regions of Patience and Tranquillity tend to arrest all active basilar excitement, producing quietness in the muscular system, circulation, and respiration, and a serene but not somnolent condition of the mind. Hence, to touch these regions on the head or body is an excellent preparation for inducing sleep, as it quiets the muscular system. On the body, Patience is found at the upper surface of the shoulders, at their junction with the neck, and Tranquillity on the chest, a little below the axilla. The comfortable repose produced by these faculties is not sleep, though favorable to rest and restoration. The activity of the brain needs to be still more lowered, and this is accomplished by the tibial region and the foot — the former, which reduces respiration, reducing mentality to its lowest grade, and the latter to entire extinction. The tibial influence (corresponding to the life of the cold-blooded animal) is favorable to nutrition and animal life and unfavorable to fever and inflammation. Hence it is peculiarly valuable when feverish or inflammatory conditions exist. The cerebral activity is reduced lower by the upper surface of the foot, and to its lowest or comatose condition by the bottom of the foot. Hence the foot is very effective in overcoming the most excited conditions of the brain, and the warm foot-bath is a great relief to the head in fever.

But the hygienic purpose of sleep is not fully accomplished by these measures. Its beneficial effects come not only from repose and cessation of waste, but from assimilation and excretion. Hence we need for perfect sleep a faculty that will sustain the assimilation and excretion. The organ for this is the true central organ of Sleep, lying in the brain above and behind the ear, in antagonism to Consciousness or intellectual wakefulness, which it tends to suppress, and on the chest behind the middle of the arm, a little lower than the tips of the shoulder blades. Its action in the brain is intelligible, as it tends to restrain and suspend intellectual action (the entire suspension of which is sleep) and to diminish Calorification and Respiration, being adjacent to Coolness. Its close connection with Adhesiveness and proximity to the cautious region indicate quietness and assimilation, for Adhesiveness is an assimilative faculty. Its occipital position also gives it a moderately tonic character.

On the body this is more clearly illustrated, as it is located on the space between the lower dorsal ganglia, which supply by their branches the abdominal system, and the great solar and semilunar plexus or general controller of the abdominal functions. Hence it tends to give them a predominance in their vital character of absolute indolence, in which the visceral system is opposed to the muscular. In this condition, the muscular system of animal life being relaxed, the action of the heart would be materially reduced and the circulation moderated. Hence digestion and assimilation would be more active than other functions, but would proceed slowly, yet in the absence of wasteful activities would restore and nourish the organs, and remove the accumulation of waste material, thus producing the sound, normal condition of the organs, and the pure, fresh condition of the blood, which give us the buoyant condition of the first hours of the morning. The absorption of oxygen during sleep being greater than its consumption by vital action brings the blood to its best condition.

These are the essential conditions of restorative sleep produced by the organ of Repose and assisted by Patience and Tranquillity, which serve to remove all excitement, and by the leg and foot, which lower cerebral activity and counteract feverish or inflammatory conditions even more effectively than Repose. Warmth and circulation in the lower limbs are necessary to Sleep.

As the region of Repose produces its effects through the solar plexus and abdominal action, it is assisted by the regions of Somnolence and Assimilation, which extend on the abdomen below the sternum and thus correspond with the plexus. Hence the application of a hand on the abdomen, extending upward from the umbilicus, is valuable as an adjunct to Repose, especially to precede it. On the

head we may easily apply the thumb on Repose and the fingers on Somnolence.

Sleep also depends upon the relative activity of Energy and Relaxation. The former rouses the whole brain to an activity incompatible with sleep, and those in whom it predominates greatly are naturally wakeful and require less sleep than others. Relaxation, the source of indolence, makes us desire rest and take pleasure in the couch. Relaxation is a central abdominal locality, and all strong abdominal action such as follows gluttonous indulgence produces indolent relaxation. Hence a substantial supper with liberal use of fluids promotes sleep. For the opposite reason a dry, cold, bracing atmosphere makes the nervous system too active for sleep, which a warm, humid atmosphere promotes.

Finally, the functions promotive of sleep are Somnolence, Repose, Relaxation, Lethargy, Nutrition, the aquatic influence of the tibia, and the vegetal and mineral influences of the foot (the cephalic control of which is reached through the neck) — all of which may be requisite in cases of insomnia, and all of which assist the predominance of visceral organic life over active animal life.

These soporific influences are happily imitated by the new remedy SULFONAL, the least objectionable of all soporific medicines. When sleep is hindered by over-excitement or excitability, the most efficient sedative is the *Xanthium spinosum*, a remedy highly successful in hydrophobia. Cochineal and the extract of lettuce, lactucariam, are also valuable as mild hypnotics.

There is a restless excitability at the knee which often interferes with sleep, which should be allayed by dispersive passes toward the foot. A similar effect may be attained by a wet pack around the knee or including the leg and foot, not allowed to evaporate.

CHAPTER XIII.

THE ABDOMINAL AND CRURAL REGIONS.

The Gastro-enteric region, its locations and treatment — The anti-abdominal or tonic (and the atonic) region — Its accurate demonstration and location by European physiologists subsequent to my discoveries — The brain convolutions that it occupies shown in engraving — Its psychic functions — Debilitating influences of abdominal region — PHILOSOPHY OF INTEMPERANCE — Its medical and electric treatment — Illustrative experiments — Organ of intoxication discovered — Remedies for gastric derangements — Philosophy of absorbent and repellent functions — Modes of treatment.

ABDOMINAL LOCATIONS — 1, Epigastric region — 2, Assimilation — 3, Respiration — 4, Calorification — 5, Excitability — 6, Lethargy — 7, Sexuality — 8, Melancholy — 9, Selfishness — 10, Irritability — 11, Abdominal functions from digestion to defecation — 12, Disease — 13, Expression — Philosophy of Calorification and Coolness — The lower limbs — The thigh, Locomotion, Nutrition, Turbulence — The leg, its relation to evolution — Fanciful notions of a microcosm — Range of forces in the genesis of man, mineral, vegetal, animal, radiata, mollusca, vertebrata, aquatic, aerial, mammalian — Locations of animal life on leg, its application to physiology and therapeutics — Suppression of inflammation, pneumonia, and fever, and control of all vital functions by Hæmospasia.

THE Gastro-enteric region, controlling the alimentary canal, is located in the brain at the base of the middle lobe, running inward along the base of the petrous ridge of the temporal bone, and is reached from the surface along the course of the lower jaw, from its insertion in the glenoid cavity downward to about midway between its posterior angle and the centre of the chin.

The corresponding tract on the body extends downward and forward from the margin of the ribs to a point midway between the umbilicus and the inguinal depression or angle between the thigh and the abdomen. Along this tract the alimentary canal may be controlled. At its upper end we rouse the activity of the stomach, and as we descend we act upon lower portions, the lowest being efficient in promoting evacuation of the bowels. Constipation is overcome on this tract by downward manipulation and vigorous action at its lower extremity. Hence a great deal of the massage blindly applied upon the bowels has been successful. The most effective manipulation follows the course of the colon, ascending on the right side, crossing, and descending on the left.

In irritations, such as those of diarrhœa, cholera, dysentery, and colic, dispersive passes backward and upward should be made with energy, and a general stimulation along the spine. The complete

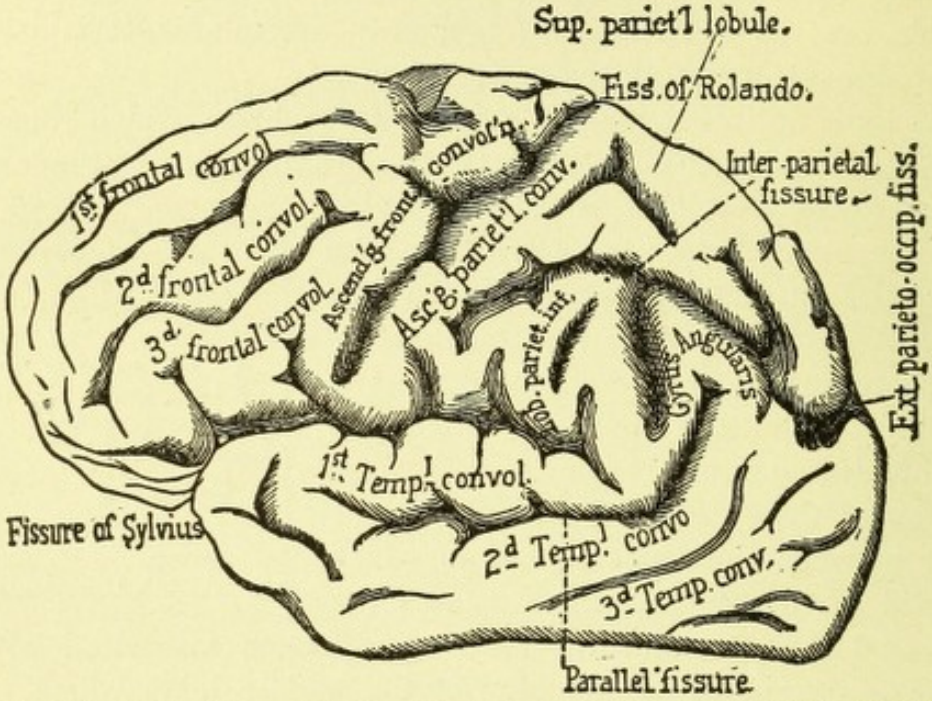
control over such conditions is effected on the top of the shoulder, and on its upper posterior aspect. The anti-abdominal region, which tends most strongly to suspend all abdominal action, lies on the upper surface of the head immediately behind, adjacent, and parallel to the organ of Integrity, in a line from the anterior part of Firmness, terminating at the posterior part of Sanity, a region marked on the psychic bust as Fortitude, Energy, and Cheerfulness, terminating at the prominent centre of the parietal bone.

The tonic or anti-abdominal region of the brain, which rouses the muscular energies, is not strictly confined to the space just mentioned, but on a well-developed head occupies a territory about two inches wide on the temporal arch, running to the median line, where it occupies about three inches antero-posteriorly. In the engraving this is marked T, and the opposite atonic or abdominal region is marked A. Thus we understand how the constitution is balanced between the tonic power, of which the will is the centre, which rouses the brain and muscles, and the relaxing influence associated with the abdomen (belonging to the base of the middle lobe) which relaxes all our energies for rest and sleep. This tonic region, which commands the muscular energies, though not the direct organ of muscularity, has been fully demonstrated in accordance with my principles by French, German, and English physiologists as the region involved in muscular paralysis. My discovery, however, has many years' priority, dating from 1841, but for its exact relation to the convolutions I am indebted to the foreign physiologists who have shown that our command of the muscles in voluntary action depends on the convolutions which occupy the space I have described, viz. (in the following map of the brain referred to by Prof. Charcot), the ascending frontal and ascending parietal convolutions and superior parietal lobule. The inter-parietal fissure being the boundary of this energetic region, the reader will perceive its breadth increases as it approaches the median line. The volitionary muscular energy of this region depends upon the development of the coarser elements of the nervous system, which give motor power. Charcot says: "According to the researches of Retz, the great pyramidal cells exist but in small number with very young infants; it is only later that their number increases, and that increase is effected, according to all appearances, under the influence of functional exercise."

The anterior superior portion of this region has been shown to

sustain the movements of the head and arms, while the more energetic posterior portion governs the movements of locomotion by the lower limbs.

But this entire region has its psychic as well as its muscular functions, which increase our energy, and these have not been sought by



Convex surface of a hemisphere of the human brain (parietal lobe partly schematic). After Charcot.

European physiologists, and will not be recognized as long as conservative opposition can defy a positive science. The habit of ignoring the psychic has become chronic and hereditary. But as all know the brain has psychic functions, the knowledge of their location must be of great value in diagnosis.

In the above engravings the reader will observe the remarkable coincidence between my experiments and discoveries (of 1841–42) and the results of human pathology and vivisection on animals of the last twenty years which have confirmed them. He will also observe another corroboration. The convolutions labelled *Gyrus angularis* occupy the exact position which I give to the occipital organs that co-operate with vision and give power to the eye; and this is the location to which Dr. Ferrier ascribes the visual power, by destroying which in the pigeon he produced blindness of the opposite eye. A thorough examination of the results of pathology and vivisection will show how remarkably, as far as they go, they have corroborated my discoveries made thirty years earlier.

The abdominal region in predominance has a relaxing, debilitating character, whether that predominance be produced by excessive food and drink, by oppressive undigested materials, or by irritations and inflammations. The utter prostration of all physical and mental en-

ergy which occurs in dysenteries, fevers, and other abdominal irritations attests the character of that region.* Its antagonist in the shoulder is the region of Energy, which brings all the vital forces into active play, and makes us intolerant of idleness. This region of Energy, corresponding with the top of the shoulder, on which we bear our burdens, directs the vital forces, according to the pathognomic law, to the brain and from the abdomen, producing thereby the indifference to food which we feel when our interest and energy are roused. The same indifference to food and drink is produced by the tonics and nervines which rouse our energies, whether they be drugs or moral influences, and it is by the use of nervine tonics that we increase the moral energies and subdue the urgency of appetite, so as to enable one who wishes to reform to overcome the propensity for intoxicating drinks.

Temperance societies have relied too much upon an energetic warfare against alcohol, but intemperance does not depend entirely upon the temptation offered by the free sale of alcoholic drinks, and cannot be entirely controlled by limiting the sale. It depends upon a natural appetite which exists in the base of the brain in the posterior part of the organ of Alimentiveness, which comes into play under circumstances of nervous depression or exhaustion, just as thirst appears when there has been an exhaustion of fluids. Hence a demand for stimulation of some sort is almost as universal as a demand for food and drink.

This nervous depression, or lack of cheerfulness and buoyancy, arises not only from depressing causes but from the predominance of the base of the brain, influenced by the discordant condition of society — the predominance of the animal over the moral, which is a condition more or less gloomy and eager for enlivening influences. Hence the *present development* of the human race has the conditions in which intemperance *must flourish*, and all savage races become drunkards when they have the opportunity. But women, who have a decided predominance of the moral over the basilar region, are very seldom addicted to intemperance, and when men are equally developed they will become equally temperate.

This development is often effected by powerful religious impressions, and the greatest success in the treatment of intemperance has been in the inebriate homes in New York and Philadelphia, in which religious influence is relied upon.

There is not sufficient moral energy in most persons to resist the

* This prostration of strength is not by a normal concentration upon the abdomen, but by intense abnormal irritation, which, attracting the nervous energies, paralyzes the antagonist region. Any intense action in the abdomen has that effect, as every organ in the human constitution under intense excitement paralyzes its opposite.

discouraging and depressing influence of the struggles for a livelihood, the competition of rivals, the hostility of enemies, the uncertainty of business, the lack of reliable love and friendship, and the moods of ill-health. From such depression we may be relieved by cheerful society and friendship, by the moral enthusiasm of any great and worthy purpose, or by fervent religious sentiments; or we may be placed permanently above the gloomy level of intemperance by such a moral education as will give the higher sentiments an unchangeable control.

I see no hope for the eradication of intemperance by law until moral education shall have done its work. But in the meantime every beneficent influence, every happy social influence, everything which diminishes the burdens and calamities of human life, everything which increases the influence of women, everything which gives cheerful and innocent amusement, contributes to diminish the demand for alcoholic stimulants. It is diminished too by substituting vegetable food and fruits for animal food.

The purification of the atmosphere, the removal of the sources of malaria, and all that improves health, contribute to temperance, while malaria and misery work in the opposite direction.

I think it not impossible to prepare medicines which will so effectually sustain the energies of the nervous system as to check intemperance and reduce its ravages to a small amount, and I do not hesitate to prescribe such remedies in any case, modified to suit the temperament or condition of each individual. Intemperance may be based upon conditions of the nervous system, the liver, or the digestive organs, which must be controlled by the remedy. I have long taught my students the value of the tonic hydrastis to fortify the stomach against the alcoholic appetite, and have had some favorable reports of its success. Quassia has also shown great efficiency in the same way. I have successfully recommended a combination of equal parts of tinctures or fluid extracts of hydrastis, quassia, cypripedium, and Erythroxylon Coca, the latter two producing a sustaining and tranquillizing influence.

A diet should be adopted in which fruits, cereals, and vegetables are most prominent, the greatest benefit being derived from fruit, and the stimulation desired should be sought in tea and coffee. Under such regulations the alcoholic appetite is much more easily subdued. The treatment should be dispersive from the gastric region, and generally upward over the abdomen, and should stimulate the entire upper region of the trunk, front and back, above the mammæ, to produce that elevated, happy, amiable, and firm condition in which ardent spirits are repulsive.

They are extremely repulsive to refined women, on account of the influence of their moral nature, which pervades every fibre and repels all gross and debasing influence. But in proportion as the basilar forces are roused, coarse stimulants and gross food become acceptable. I have found in my experiments that when the organ of Love of Stimulus is gently roused it requires mild stimulants, such as tea, coffee, and condiments, ardent spirits being disliked; but as it is further excited, malt liquors and wines are desired, first diluted, then pure; and a delicate female whom a spoonful of brandy would almost intoxicate may be made under this basilar influence to seek the strongest liquors and drink them like an old toper without becoming intoxicated, just as one exhausted by hemorrhage or prostrated by serpent bites may take a pint of brandy without intoxication. This impunity depends upon the depressant influence of the Love of Stimulus, and if that should cease to act extreme intoxication would appear at once. Thus when the very impressible Mr. Inman had taken a drink of brandy under the influence of Love of Stimulus without showing any effect, I supposed the impunity would continue, but when I continued my experiments, exciting the upper region of the brain, diverting the activity from the Love of Stimulus and thus destroying his capacity for enduring it, he suddenly sunk to the floor dead drunk, to my astonishment, and could be relieved only by re-exciting the Love of Stimulus and base of the brain. For a similar reason, in convivial assemblies we see intoxication much sooner reached under the influence of social pleasure than when men are sipping their liquor alone or taking it as a stimulus under the pressure of business. Men of a coarse and morose nature drink large quantities with impunity, while the more amiable class speedily succumb in intoxication, and are more rapidly destroyed, as women would be if forced into drinking. Hence the most signal examples of alcoholic ruin occur in the brightest members of society, who are seduced by the influence of bad examples and local fashion from their natural temperance, or who yield in moments of temporary depression.

The appetites for food, drink, and stimulation being at the base of the brain are necessarily roused by basilar action — by a stirring, active life, especially when such a life is associated with no cheerful, pleasant influences, but is in the sphere of selfishness and rivalry. The hunger of active labor is much more urgent than that of sedentary pursuits and requires a freer supply of nitrogenous or animal food. Its nervous depression (for basilar action or muscular exertion consumes the vitality of the brain) creates the demand for stimulation which leads laborers by millions to the shops that supply them beer, gin, and whiskey. The demand for these will not cease until

labor can be made less depressing. When the circumstances of labor are more pleasant and social, when its monotony is relieved by song, music, and conversation, when the atmosphere of the shop is made pure, its society refined and polite and all its features agreeable, the laborer will be relieved from the *intense* craving for stimulus.

The man who resolutely desires to reform may find it a desperate struggle to resist the unbalanced action of his brain, producing a passionate craving, but if assisted by nervine tonics he will certainly be able to conquer, and if of the impressible temperament, a little nervauric treatment will completely banish the evil influence. In ten minutes the appetite of the sensitive may be extinguished and alcoholic drinks made loathsome, and if this process is repeated, as often necessary to make the temperate inclination habitual, all danger will be banished.

In my early experiments upon the brain I discovered in the region marked Relaxation that peculiar disorderly form of relaxation which belongs to the intoxicated, occupying a very small space. As conditions, impulses, and faculties are developed by environments, I regarded this as a modification of the relaxed condition due to alcoholic influence, simple relaxation being due to the impression of a very large quantity of food — a relaxation of the mental as well as physical powers. This relaxation may be due to irritations of the abdominal region (which are very debilitating) as well as to oppression by food. The alcoholic relaxation is accompanied by a certain disorderly stimulation as well as debility which is well known as a state of intoxication. When this locality is well developed there is a great facility in assuming the intoxicated condition.

The researches of Dr. T. D. Crothers have thrown additional light on this subject, by showing that certain persons possess this intoxicating faculty in a high degree, and may even exercise it and thus fall into intoxication *without the use of any alcoholic stimulant*, from the influence of example or even from strong mental excitement — thus placing beyond doubt the existence of this faculty, the discovery of which surprised me.

The healer will most readily relieve abdominal irritations and diseases by dispersive passes upwards with one hand while the other is on the top of the shoulder, treating each side alternately; but I should mention for his benefit some simple remedies which he will find very serviceable, either by external application or by internal administration. There are more than a hundred remedies in our materia medica which I have found of marked value in their direct action on the stomach, to soothe, invigorate, or relieve it. In flatulent conditions angelica and celery seed are the most useful, but when the

disturbance amounts to a colic, *Dioscorea villosa* is a sure reliance. In gastric weakness mild tonics such as camomile, columba, and coptis (gold-thread) are very beneficial, but a more efficient tonic restorative influence, extending to all the viscera, is found in the balmony (*Chelone glabra*), barberry (*Berberis vulgaris*) and the *Ptelea trifoliata*; the balmony, barberry, hydrastis, and mountain ash (*Sorbus aucuparia* are all efficient in resisting the alcoholic appetite and repairing its ravages. The flow of gastric juice may be promoted by *Alnus rubra* (tag alder), assisted by a little capsicum and inula (elecampane). A fluid extract of the flowers of dandelion appears more beneficial to the stomach than anything else that I have used.

The deranged conditions of the stomach from irritations and improper contents are generally relieved by charcoal and the presence of acid by calcined magnesia. If this is not sufficient, the following prescription may be relied on: —

Fluid Extract of Scrophularia nodosa,
" Cochineal,
" Triosteum perfoliatum,
" Sambucus Canadensis,

each one ounce — mix. Dose, a teaspoonful every two hours until relief. In most cases, however, the scrophularia alone is sufficient. I do not object, however, to the fashionable subnitrate of bismuth.

The use of pepsin or lactopeptin as an assistant to the powers of an enfeebled stomach will overcome many difficulties. Pancrobilin appears to be a valuable aid when the liver and pancreas are at fault, assisting duodenal action and digestion of fatty foods.

In treating the abdominal functions the hands should be applied on the lumbar as well as the lower dorsal region — the dorsal region having more to do with the digestive and assimilative functions, and the lumbar region with the expulsive functions of the lower intestines.

Psychologically speaking, the tendency of the upper half of the body is attractive and retentive — the lower half hostile, degrading, and repellent. Physiologically, the character is the same: the upper half of the body tends to vitalize and retain the nutritive elements — the lower half to degrade and expel them; fecal material is expelled by the ileum, nutrient material is carried up by the thoracic duct. The exercise of the lower limbs rouses the lumbar portion of the cord, strengthens the expellent functions and overcomes constipation. The lower half of the alimentary canal, which sympathizes with the violent passions, is always more developed in the carnivora than in the herbivora.

The treatment of the abdominal functions through the brain involves their stimulation through the lower jaw, and their control

through the region behind Integrity, which extends from Firmness, (behind Integrity and Cheerfulness) over the temporal arch, just behind Sanity. The hand upon this region checks the abdominal irritation like an anodyne tonic. Upon the jaw before the ear, the fingers produce the same effect as applications upon the alimentary tract on the abdomen. If we place the middle finger upon Alimentiveness before the ear and the thumb upon the organ of Health, the effect upon the sensitive is a gradual restoration of healthy action to the stomach. In like manner we may rouse the healthy action of any organ by placing one hand upon the region of Health in the body or the head, and the other where we would direct the healthy action.

The Love of Stimulus, occupying the posterior portion of Alimentiveness, immediately at the cavity of the ear, I have found no difficulty in exciting separately so as to produce a desire for alcoholic stimulants and ability to bear them.

In stimulating the digestive organs through the brain, we should recollect that the whole posterior basilar region contributes to their energy, and therefore we may reinforce them by applying the hands around the base of the brain on the level of the ear.

Let us now briefly review the functions accessible through the abdominal surface, to imprint them on the memory.

1. At and below the lower end of the sternum, which would be called the epigastric region, we have Sensibility, Somnolence, and the region of Impressibility, through which we exert a tranquillizing, soporific influence, during which we may elicit the intellectual phenomena of trance, psychometric perception, clairvoyance, sympathy, and develop the curability of diseases by nervauric and spiritual influences. This region brings the patient completely under the influence of the operator. The corresponding cerebral region extends from the root of the nose to an inch behind the brow. The word Sympathy conveys a correct idea of the general tendency of this region. The sympathy is intellectual, emotional, and physical, and may amount to an entire surrender to the control of the operator. Those who are largely developed in this region easily become mesmeric subjects or fall into the class that are controlled by a word.

2. Just below the epigastric location, extending to the umbilicus and about two inches below, we find the region of assimilation and absorption, the influence of which is pleasant and soothing, harmonizing well with the soporific influence above, while promoting nourishment and digestion.

The influence of these two regions, especially the upper, is extremely amiable. The spiritual, psychometric, and clairvoyant

faculties are closely associated in the brain with the intellectual, amiable, and sympathetic faculties. Hence there is generally a remarkable degree of refinement, beauty of sentiment and language, and kindly, benevolent, and ethical teaching in connection with trance speaking and psychometry.

3. Below and around the umbilicus, exterior to the region of Assimilative Absorption, is the region of Respiration, corresponding with the respiratory organs around the mouth and nose, of which I shall speak in connection with the thoracic organs.

4. Below the umbilicus, half-way to the pelvis, is the region of Calorification by which we develop heat — which is actively concerned in all fevers, and which produces an ardent temperament.

5. Below Calorification comes the uterine region, which might in a psychic sense be called the region of excitability. This gives the tendency to hysteria.

6. Below the uterine region is the mons veneris or pubic region, which is associated with a tendency to lethargy and sleep and corresponds with the position of the urinary bladder.

7. On each side of the pubic region extends the groin or angle between the thigh and abdomen, which corresponds with the sexual evacuations, menstrual and seminal. It is the upper part of the *Sexual region*, which includes the sexual organs, which correspond to Amativeness, located on the bust at the larynx — a function just below the medulla oblongata. The lumbo-sacral is the region of virility, located on the head just below the occipital knob.

8. Above the sexual region and in front of the hips (the anterior margin of the ilium) is the region of Melancholy. It antagonizes the region of Cheerfulness at the armpits.

Melancholy is an abnormal or excessive manifestation. The normal action produces a serious frame of mind which recognizes difficulties, obstacles, or hostility.

9. Above Melancholy, on the side of the body, between the hip and ribs, is the region of absolute selfishness, which is antagonistic to every conception of duty to others and to all moral dignity. Its physiological influence is to reinforce the appetites and animal passions, and in some persons it needs stimulation to revive animal life and physiological processes. In predominance it may be called Baseness.

10. Just above the region of Selfishness, on the side, is the region of *Irritability* on the lower margin of the ribs, the effect of which if strongly excited is highly exciting and irritating. Dr. Beard, I believe, is the only electrician who has discovered and mentioned the character of this region. He says (p. 343): "This sensitiveness is, of

course, more in the thin and the nervous than in the corpulent and phlegmatic. It is usually most marked on the *inferior ribs on the right and left side of the body*, over the liver and spleen. The peculiar sensitiveness of the ribs at these points is sometimes erroneously supposed to indicate disease of the organs beneath them." It is a curious fact that Dr. Ferrier once struck upon the corresponding location in the brain without understanding it, when he enraged a cat by exciting the basis of the middle lobe.

11. Anterior to Melancholy and Selfishness is the region of the abdominal functions, controlling the alimentary canal, running from the margin of the ribs to Defecation, half-way between umbilicus and groin. The upper end, relating to the stomach, corresponds to Alimentiveness. The lower location is marked on the large chart *Def.*

12. Anterior to Alimentiveness is the region of Disease, located along the margins of the ribs. Scientifically speaking it might be called the centre of organic sensibility, but practically it may be properly called Disease, as the tendency or liability to disease is proportioned to its predominance over the health-sustaining power of the upper occiput and shoulders. It is the region of congestion of blood in the portal veins — the most degenerate blood in the body.

On this zone of the trunk is found anteriorly the maximum sensitiveness and maximum liability to injury. Brown-Séquard found that animals killed by a shock through the diaphragm were killed more quickly and surely than when assailed through the head. In such cases the blood after death was fluid, the abdominal viscera congested, and the thoracic region nearly empty.

13. The remaining space between the Alimentive, Morbid, Respiratory, and Sympathetic regions is a region of emotional impulse or excitability, corresponding to the cerebral region of Expression behind the face. It explains the sympathy of the brain with abdominal conditions. In the upper portion of this region of Expression, which is adjacent to the sympathetic region, the emotional influence is of the amiable and soothing character. In the lower portion it is exciting and stimulating, partaking of the character of deep Respiration and Ardor. The therapeutic value of these organs consists in the soothing, yielding influence which is found on the surfaces above the umbilicus, and the more exciting or stimulating influences which are found below the level of the umbilicus, producing deeper respiration and greater warmth. The level of the umbilicus may be taken as the division between the soothing and exciting influences of the abdominal surface.

Of the organs just enumerated, Calorification requires a full exposition, not only for therapeutic purposes, but as an illustration

of physiology and pathology. For the present, however, I shall speak of it merely for therapeutic purposes. Briefly, the calorific function is located as to its origin in the brain, at the medulla oblongata, which we reach through the chin, and it is developed in the body by an influence passing down the cord and proceeding from the dorsal ganglia to the abdomen, in which it is developed through the ileum and is reached through the external location, between the os pubis and umbilicus. Hence warmth is developed and diffused by covering the chin with one hand and the occipital base with the other, or by placing one hand on the hypogastric location of Calorification, and the other at the lumbo-dorsal junction. The anterior locations develop caloric, but the posterior assist and give it a more healthy diffusion.

The region of Coolness is on the side head, about the middle of the vertical line rising from the posterior region of the external ear, and on the body its location corresponds nearly with the middle of the posterior line of the arm.

Hence in treating a chill by the battery we pass a current from Coolness to Calorification, and in treating a fever we reverse the current.

Fevers may also be treated by a current of hot water poured on the lower abdomen, and typhoid fever is especially benefited by this, as it involves disease of the small intestines. The great benefit of plunging the feet in hot water at the beginning of a fever is due to the influence on the hypogastric region and the diversion from the brain, as well as the sedative influences of the hot water, and the sedative, cooling influence of the tibial region and the foot.

The experiments of Brodie, of Chossat, and of Heidenhain have fully proved the dependence of calorification on the nervous system, the origin of the power in the brain, and the capacity of the nervous system either to develop or to depress the heat of any part of the body; but no one has heretofore discovered this corporeal seat of calorification or understood its relations to the brain. The nearest approach was in the much-neglected experiments of Chossat, who showed that calorification was interrupted by sections of the splanchnic nerves and also by tying the abdominal aorta. Thus he came near completing the demonstration that calorification is chiefly dependent upon the ileum, in which fecalization is performed — the locality in which irritations and inflammations produce the most intense fevers. Fevers associated with abdominal disease at other locations have a lower temperature and less continuous heat. At the spleen the intermissions are much longer than the fever. At the liver the fever is remittent; at the stomach the temperature is lower (as in yellow fever); but

when the hypogastric region is involved the fevers are severe and continuous and the influence upon the brain greater. The ileum is associated with Calorification consequentially, as the effect of Calorification is to leave the incombustible fecal matter for discharge by the ileum. Hence this discharge continues in fevers whether food is taken or not.

In nervauric treatment, chills would be overcome by applying the hands on the chin and the occipital base, or on the hypogastric region and lumbo-dorsal junction, or by manipulations from Coolness on the side to the hypogastric region.

Fevers should be overcome by dispersive passes from the hypogastric and hypochondriac locations, and stimulating the regions of Coolness and Health. Great assistance may be given by the aquatic region of the tibial surface, especially when there is any inflammation. I think the tibial surface will be quite a valuable resource in eruptive diseases when there is much heat of the skin. Erysipelas will be controlled by the tibial region as well as by jaborandi.

The LOWER LIMBS sustain important relations to the lungs, the brain, and the vital force and development.

The thigh, depending on the lumbar region, is the seat of the strongest animal power, and is the region through which to reinforce the muscular system. The locomotion and labor sustained by the frontal surface of the thigh should be roused by vigorous percussion whenever we wish to increase the physical strength. The lateral and posterior surfaces of the thigh are also highly invigorating, but much more impulsive, bold, and restless in their moral influence. Hence they are specially beneficial to those who are quiet and timid. The region of Vital Force at the summit of the thigh is beneficial in all cases of weakness. Its best effect is produced in combination with the health region of the shoulders, or the region of Cheerfulness in the axilla. It also forms a happy combination with the region of Hope on the upper surface of the breast, above the nipple.

As we approach the knees, the crural influence becomes more decidedly restless. Hence the dispersive manipulations from the knees to the feet have an especially soothing influence. The posterior aspect of the thigh has the general character expressed by the word Turbulence, and hence co-operates with the criminal impulses when very large. The internal aspect of the thighs need not be stimulated except in those addicted to a passive, ascetic, or careworn life. Its tendency is toward dissipation, sensuality, and vagrancy.

The upper posterior lateral surface of the thighs, the region of Nutrition, is almost always a necessary locality for the treatment of

patients, for few are ever out of health without a deficient supply of red blood. Nutrition develops blood and flesh and moderates nervous excitability. It is quite convenient to excite Nutrition and Vital Force at the same time, by the hand or by the negative sponge. In standing erect with the arms hanging, the wrist comes upon the head of the thigh bone. Then moving the hand back the palm would come upon the region of Nutrition. One may practise upon himself by placing the hands thus upon Nutrition when he retires at night. I practised thus upon myself in 1871 with good effect until I thought it better to check than increase the effect. Mr. C., one of my most intelligent students, informed me that he had tried the experiment upon himself in 1888, and in a short time increased his weight twenty pounds.

Below the knee we find in the leg one of the great wonders of Sarcognomy. The leg corresponds to the pre-natal embryonic development which illustrates the law of evolution and the microcosmal character of the human constitution. It corresponds to all below the grade of humanity — the animal, vegetable, and mineral kingdoms.

In the fanciful phraseology of imaginative writers we are often assured that man is a microcosm, without a single definite statement of the basis of this conjecture. He certainly does not contain in his constitution all the chemical elements, nor is his life governed like the solar system by gravitation and momentum. No resemblance to the universe has been pointed out, and his ability to *comprehend* imperfectly the universe does not make his constitution a microcosm. The statement therefore is a baseless fancy or conjecture.

But it was discovered by my experiments in 1842 that the elementary forces of nature bear a wonderful relation to the genesis of man; that he retains in his constitution a record of the creative or evolving power which advances to the height of humanity through all the prior steps of evolution, and thus gives man a microcosmal relation to evolutionary forces.

Humanity proper begins at the knee; all below corresponds to the animal, vegetable, and mineral kingdoms and reproduces their conditions in our experiments. The foot which stands upon the earth has a mineral character in the surface which touches the earth; above the bottom of the foot the character is vegetable; and above the ankle animal.

It is easy to trace upon the leg the development of the higher kingdom, the Vertebrata, which occupy the space between the knee and the ankle, changing near the ankle to the mollusca, articulata, and radiata. Upon the upper surface of the foot we have the vegetable

kingdom, and on its lower surface the mineral kingdom, corresponding to the entire globe. Each animal of the vertebrata may be recognized at some portion of the vertebral region (from the knee to the foot), and we might locate upon the leg, if it were of any importance, the dog, the horse, the shark, the whale, the eagle, the serpent, etc., and in the vegetative region the trees and herbage. However wonderful or incredible this may seem it is but the statement of the results of scientific experiment, which any competent observer can verify for himself, if he follows my methods, avoiding mesmeric, hysteric, or imaginative subjects controllable by a word or by sympathy. I believe no one has ever adopted my methods of rational experiment without verifying my statements. But, laying aside the curious and wonderful, for practical utility, we find in this representative microcosmal region some of the most important functions that modify life and control disease.

The vertebrata, divided into fishes, reptiles, birds, and quadrupeds or mammalia, are represented in corresponding groups on the leg. The fishes and reptiles occupy the anterior or tibial surface exterior to the edge of the tibia ; the next vertical section of the leg, extending just around the posterior exterior angle of the muscular prominence, is devoted to the birds, and the remainder, the body of the calf, is devoted to the mammalia.

The consequences of this arrangement are very important. The anterior or aquatic surface corresponds to a lower grade of vitality and sensibility — a cold, unintellectual, unsensitive, uninflammable temperament. The aerial region of bird life is associated with a more active temperament, greater warmth and activity of respiration, while the mammalian region is associated with the greatest development of animal life and a temperament more like the human, excepting its intellectual inferiority.

Hence, in stimulating the calf of the leg we reinforce animal life, very much as we do on the thighs. In stimulating the exterior aerial region we favor the activity and vivacity of the temperament ; but in stimulating the aquatic region of the front we make an entire change of temperament, carrying it below the level of inflammatory and febrile diseases.

Below the vertebrate class of birds, there is not sufficient nervous development to be capable of inflammation. The reparative power increases as the inflammatory capacity declines, so that wounds are healed and parts reproduced without inflammation.

In the vegetable kingdom, without a nervous system or intelligence, the reparative power is at its maximum, and inflammation and fever are impossible. Zoophytes are as free from inflammation as

plants. Polypi may be cut to pieces and stuck together as successfully as plants may be grafted. Worms, too, may be cut to pieces and left to grow as separate individuals or stuck together to grow as one. Among the Articulata and Mollusca the reparative power is immense, but the inflammatory tendency imperceptible. Crabs, lobsters, and young spiders reproduce their legs when torn off, without anything like inflammation. The snail reproduces its head if the upper ganglion has not been destroyed. In the oyster and mussel the death and putrefaction of a part of the body is not necessarily fatal to the animal. Fishes reproduce their lost fins and heal all their wounds without inflammation or suppuration. Lizards, serpents, salamanders, frogs, and toads have great reparative power without inflammation. The lizard even reproduces its tail. Prof. Macartney removed part of the brain and skull of a toad, which was healed without inflammation. It is in birds that we first find the nervous system sufficiently developed to be capable of inflammation. Quadrupeds are still more liable to inflammation. The maximum inflammatory and febrile capacity, generally with the least restorative power, is found in man.

But as man in his embryonic life passes through the lower forms of life, it is only after the second month that he attains the inflammable constitution, but the lower elements which existed in the embryo continue to exist in the matured form, though overlaid and concealed by the higher powers, and the mature man retains in his constitution the elements which sympathize with all animal life, and which sometimes come to the surface, as in the barking and biting of hydrophobia and the imitations of animals practised under a species of religious insanity at camp meetings in our early history.

Sarcognomy has brought out these buried elements of embryonic life and given them a definite location on the legs, corresponding perhaps to the summit of the spinal column and portions of the base of the brain.

The utility of the discovery is this: If the impressible subject can be carried back to the aquatic form of cold-blooded life by exciting these organs on the body *he may be carried below the stage of inflammation and fever.*

This, I believe, is one of the most important discoveries ever made in pathology and therapeutics, for in all very impressible persons the aquatic location may be excited until they feel the mental stupor or vacancy of mind, the blunted sensibility, and the inclination to an aquatic life. They say they feel like lying down or floating in the water. The respiration is greatly diminished as well as the mental action. The lungs not only become quiet, but lose their irritability,

and all inflammatory or irritative conditions of the lungs are subdued.

The aquatic region of the leg, then, is the region to which we must look for the cure of pneumonia and bronchitis and the alleviation, if not cure, of consumption, by stimulating the tibial region or by galvanic currents with negative rheophores on the tibia, or by manipulation.

The tibial surface of the legs, then, is the counter-agent of the lungs and to a considerable extent of the brain. As we go down the leg, the antagonism to the brain increases, and on the upper surface of the foot mentality is arrested and respiration also, in proportion to the strength of the local influence. Thus does the diseased organ secure a tranquil rest and freedom from inflammatory action. I would be much obliged to nervauric healers for exact accounts of cases of pneumonia and bronchitis treated on these principles, as evidence of the extent to which they are applicable. The experience of my pupils already is sufficient to authorize me to speak with confidence.

The aquatic influence may subdue the inflammatory condition in the lungs, but we need a more active process to disperse the congestion which is the most formidable difficulty, and this we have in Hæmostasis. Ligatures around the thighs and shoulders, compelling the limbs to swell with accumulated blood, will infallibly deplete the congested lungs.

On the other hand, when the lungs, instead of being oppressed with inflammatory congestion, are feeble, anemic, and lacking in depth of respiration, they are benefited by stimulating the thigh and calf of leg, as well as the pulmonic locality in the dorsal region, and the inspiratory region on the side of the chest, parallel to the front of the arm. The thigh is especially antagonistic to consumptive tendencies, the Inspiratory region to the asthmatic, and the tibial region to pneumonia.

The entire foot is the anti-cephalic region — the bottom of the foot corresponding with the mineral region and producing a feeling of dulness and extreme heaviness. Hence protracted Galvanic currents to the soles of the feet are liable to produce depressing and injurious influences. A current from the soles of the feet to the shoulders would be of much greater general utility.

The hæmostatic method, shamefully neglected by the medical profession, may be practised by any one, but it is far inferior to the pneumatic treatment by diminishing atmospheric pressure and attracting the circulation to the regions treated, a method called by Dr. Junod HÆMOSPASIA, or attracting the blood (*hæmo*, blood, *spasia*, from *spao*, drawing). This method, when the medical profession

becomes liberal and medical practice scientific, will be the most conspicuous feature of the practice. Its neglect by medical colleges after the absolute demonstration of its power is one of the most disgraceful facts of medical history. Its value and applicability, however, can be fully understood only by those who have mastered Sarcognomy. To them it is invaluable, and it is indispensable that I should devote a chapter to its exposition, after studying which the reader will find that it is an indispensable aid to a practice guided by Sarcognomy.

P. S. — In the engraving on page 227 the tonic region T should have been made a little larger. The statement that the posterior portion or parietal lobule is devoted to the lower limbs and the anterior to the upper, has no foundation in my experiments, except that the posterior portion has a greater degree of energy and is consequently called upon in locomotion. There is no *direct connection* of these parts with special muscles, and Dr. Brown-Séquard refers to a case in which the paralysis according to the theory should have been in the lower limbs, but was really in the upper.* It is impossible to reduce the cerebrum in any upper portion to a set of motor functions, for the functions are emotional and volitionary — not muscular functions, but functions by which the muscular system is sustained, in sustaining the energy of the brain, which is *more important than muscle* to human energy.

*The language of Brown-Séquard in his lecture at the Bellevue College 1877 was as follows:

"In the neighborhood of the median line and a little posterior is a center said to be that of movement of the leg. Now, Charcot himself published, in a French Journal, with a number of admirable woodcuts, a case in which destruction of the whole of this latter portion produced paralysis of the arm instead of the leg, and consequently this would show that the center of movement for the arm was located farther backward than in other cases. In another place we find the report of a case in which there was disease of this region with destruction only of that portion in which was situated the center for the arm, but there was paralysis of both arm and leg of the opposite side. Everything behind the fissure of Rolando was destroyed, and in such a case we ought to have paralysis of the leg but not of the arm; but there was complete hemiplegia."

At a scientific congress held in Strasburg, Prof. Goltz exhibited a dog in which he had destroyed completely the so-called motor centers of the brain, without producing any paralysis, although the animal was in a demented condition.

CHAPTER XIV.

PNEUMATIC SARCOGNOMY.

Exposition of Hæmostasis and Dr. Buckler's experiments — Dr. Bevier's practice — Drs. Keltie and Robonan — Superiority of Hæmospasia — Junod and Hahnemann's case — Rationale of Hæmospasia — Balloons and caissons — Effects of light and heavy pressure on muscular and nervous systems — Origin and reception of Junod's discoveries in Hæmospasia — Effects of Hæmospasia — Summary of 293 cases — Professional neglect — Description of its success in thirty-three cases — Success of others — Its enlargement by Sarcognomy — Special treatment described — Treatment of spine — Aids to diagnosis — Various effects of pneumatic treatment — Description of pneumatic apparatus.

Our marvellous revelation from the leg of man's relation to all below him in creation, and the possibility of his subsidence back toward aquatic, vegetative and mineral conditions, carried with it the possibility of thus escaping from some of the evils of his exalted sensibility, and suspending pathological processes — especially those of his most exalted organs, the lungs and brain — by sinking below the sphere of their activity, and even suspending all febrile and inflammatory diseases by the same method — even aborting suddenly the fevers which are commonly supposed to have a predestined course admitting only of palliation.

I have long been teaching that all this may be done by drawing the vital forces below the knee in impressible constitutions by the nervauric hand, the electric or magnetic current, and any efficient mechanical means.

The most efficient mechanical means operate by controlling the circulation, withdrawing it from organs we would reduce to quiescence and taking it to those that should predominate. It is well known that this may be done by controlling and changing the atmospheric pressure ; consequently I may appeal to Aerotherapia for a corroborating demonstration of what nervauric healers do by the hand, in dissipating fevers suddenly, controlling inflammations and relieving pneumonia, meningitis, and many cases of cerebral affections which medicines do not control.

Over forty years ago I endeavored to call the attention of my pupils to the mechanical control of the circulation by ligatures and atmospheric agencies, but the very limited attention which this subject has received in this country — its shameful neglect by the medical profession for so many years, induces me to renew my appeal in behalf of Hæmostasis or Hæmospasia, not only as an illustration of Therapeutic Sarcognomy but as an indispensable measure in scientific therapeutics, which I desire especially to see adopted by those whose progressive spirit leads them to the study of Sarcognomy, for these mechanical measures are a most natural adjunct to manual nervauric

and electric treatment, and often accomplish quickly or even suddenly what no other agencies can do.

For the most ample and scientific development of this subject we are indebted to Dr. V. T. Junod, of Paris, whose early and indefatigable labors, dating back sixty years, have given to Hæmospasia its general acceptance in France, and were crowned by the Academy with the Montyon prize in medicine and surgery in 1870.

As my own attention to this subject was first attracted by the experiments of Dr. Buckler, of Baltimore, in producing Hæmostasis by the use of ligatures, I would offer the reader first my essay on Hæmostasis, a simple measure which can be practised by any one without apparatus.

HÆMOSTASIS.

As the object of manipulations, electric currents and massage is or should be to change the distribution of blood and nervous forces as well as to vitalize and stimulate the organs, it is proper that I should show how completely we may accomplish similar results by mechanical means, which have been greatly neglected by the medical profession.

There are simple mechanical means (the use of ligatures and atmospheric pressure) which give us that positive control of the distribution of the blood which no other means or measures can even approximate. The control of the blood, holding it in one part of the body to divert it from other parts, has been called HÆMOSTASIS, and the production of such effects by atmospheric means, or Hæmospasia, has been popularly called vacuum treatment. It has been neglected by the medical profession, which seems to be governed by varying fashions and the example of authority, and has been effectively practised in this country only by specialists. Being many years ago in consultation with two physicians upon a case of pneumonia, one of whom had been president of the National Medical Association and the other generally esteemed the leading physician of the city, I found them entirely unacquainted with HÆMOSTASIS; and I believe it has not been formally taught in any medical college in this country. Certainly it has been ignored in medical journals, though its efficient presentation was made over fifty years ago by M. Junod in Paris, and soon after by Dr. Buckler, of Baltimore, in this country.

The utility and practicability of Hæmostasis by ligatures were first displayed in this country by Dr. T. H. Buckler, of Baltimore, in 1843. His experiments demonstrated its entire sufficiency as a substitute for blood-letting and as a method of producing results which nothing but Hæmostasis can accomplish. No physician is fully prepared to meet the difficulties of congestive and inflammatory diseases who does not understand Hæmostasis and Hæmospasia.

Dr. Buckler's attention was attracted to this subject by the case of a man who had been superstitiously relieved from attacks of ague by tying eelskins round his arm just before the approach of the chill. Seeing that the man's arms were swelled in consequence of the eelskins being tight as ligatures — he drew the rational inference that this withdrawal of blood from the central circulation might have been the means of cure by preventing congestion. Dr. Buckler deserves credit for thus looking at such a case as a philosopher, instead of treating it with the silent contempt with which physicians usually regard singular facts and extraordinary cures; and although there is nothing in the results of Hæmostasis but what a knowledge of hydraulics would indicate, it is an important service to mankind to demonstrate these results by experiment.

When ligatures are applied round the limbs near the body with a pressure sufficient to check the return of venous blood, but not to prevent the entrance of arterial blood in the limb, the veins become greatly swollen, there is some tingling or unpleasant sensation from the distension, and the surface of the limb becomes finally of a livid red, as if it had been in an air-pump.

When the limbs are all subjected to this process at once, the amount of blood detained in them, withdrawn from the general circulation, leaves a smaller supply for the heart, the head, and trunk, and the circulation is thus so greatly reduced in force, that the energy of the pulse is diminished, the head feels light from loss of blood, and not only general weakness (and sometimes sickness of stomach) result, but in the anemic it may even be carried to fainting. Perspiration generally breaks out and every internal or external congestion or inflammation is immediately relieved, as was formerly experienced when patients were bled to fainting, with the signal advantage that no blood is lost.

The amount of blood that can be controlled in this way is different in different constitutions, but it is much more than would be controlled by any moderate bleeding, and produces a more beneficial impression on the disease.

If we estimate the total amount of blood of an average adult at twenty pounds, and the proper share of the limbs at only three tenths of the whole (six pounds), which is a moderate estimate, a vigorous Hæmostasis, by enlarging the average diameter of each blood-vessel four tenths, would about double their entire contents. This would withdraw from the fourteen pounds conceded to the head and trunk about six pounds, reducing the quantum of blood in circulation from fourteen pounds to eight, or from sixteen pounds to ten — thus taking away three sevenths.

Even if we increase the blood in the limbs only fifty per cent. we should reduce the general circulation from fourteen pounds to eleven or from sixteen pounds to thirteen; which is more than surgeons accomplish by bleeding and cupping. Dr. Junod, from his experiments, estimates the controllable amount at one hundred and thirteen ounces. The experiments of Dr. Buckler fully proved the power of Hæmostasis; and some of them are worth narrating.

A. M., a stout negro man aged twenty-eight, apparently in perfect health, came into the doctor's office and wished to be bled. His pulse was 75 and soft. All the limbs being well and firmly ligatured close to the body, the veins became distended, with tingling in the limbs, and *in ten minutes a profuse diaphoresis was developed.* The pulse was 85 and softer than previously, he felt giddy and light-headed. After twenty minutes he was in a profuse sweat, with slower respiration and occasionally a deep breath.

He was then bled in the median basilic vein of the left arm. Three ounces ran out, and the ligatures, which were too tight, were loosened to let the blood flow, and after about five ounces altogether were lost, the man fainted. The ligatures were taken off and the man laid horizontally; in about twenty minutes he recovered and sat up in a chair without the ligatures, when he was bled ten or twelve ounces without fainting. The orifice was closed and the ligatures put on again and he quickly fainted. After the ligatures were taken off he recovered strength in a short time. This case proves that a loss of five ounces under ligatures may produce a much greater impression than the loss of fifteen or seventeen without Hæmostasis.

In the case of S. M., a negro man of thirty-five, of middle stature, accustomed to being bled, there was acute inflammation of the conjunctiva of the left eye. The conjunctiva was excessively injected and the eye closed, with pain in the temple, some photophobia, loss of appetite, and pulse 100. To see if Hæmostasis would blanch the inflamed eye, the ligatures were applied to the limbs. On the lower extremities handkerchiefs were used, tightened by twisting with a stick, as the thighs were very muscular.

The ligatures made him sick and light-headed. He did not faint, but the conjunctiva was very considerably blanched. A free orifice was then made in one arm, and by the time three or four ounces had escaped the man fainted. The conjunctiva was greatly changed, but of course not as pale as the healthy eye. The bandages being removed and the man laid on his back, he recovered, and was then bled without ligatures—about twenty ounces, without syncope. Then the handkerchiefs were twisted tight on the thighs and he fainted

again. His eye was greatly relieved, and with a mild collyrium was entirely well in a few days. This shows that a twenty-four ounce bleeding without ligatures is far inferior to a four-ounce bleeding with ligatures.

E. Blake, a laborer twenty-four years of age, over six feet high and muscular, had a chill at work, and next day called for treatment with "headache, slight cough, pain in the back, a slight catarrh, white tongue, some heat of skin, pulse 90 full and hard." As he sat on the bed, the ligatures were applied and drawn tight. His veins were large, which made him a good subject. In three minutes after the ligatures were fastened he had a slight hiccough, tried to vomit, fainted, and fell back in complete unconsciousness for fifteen minutes. The ligatures were loosened, he recovered with a slight convulsion, opened his eyes as if he had been asleep, and when fully restored said, "I'd rather be bled twenty times than have them things put on me again."

He was then bled from the arm fifteen ounces without the ligatures and felt rather faint and lay down. When he felt recovered, the ligatures were tightened on his thighs as he lay, and in two minutes he fainted and was left for ten minutes unconscious. Then the ligatures were loosened and he recovered with a twitch and drank some water.

This case shows that ligatures alone were far more powerful than a fifteen-ounce bleeding.

The best illustration of the power of Hæmostasis was in the case of C. P., a negro chambermaid, aged twenty-three, robust and tall, and always in good health until the present attack of pneumonia.

Coming from a hot, crowded room through a cold damp atmosphere, without sufficient clothing, she was taken with an icy coldness of the whole body through the most of the succeeding day, followed at night by "aching and soreness in all her limbs, violent pain in the back, and severe headache." Next day Dr. Buckler saw her with violent headache, soreness of limbs, great weakness and slight cough, but no expectoration. His treatment was by bloodletting and antimony, taking on the first day fifteen ounces, on the second twelve ounces, on the third ten ounces, with a little calomel and ipecac.

The symptoms of pneumonia progressively developed and went right on toward a fatal result without the slightest benefit from his treatment. She had no sleep from the beginning, her tongue was white and dry, pulse 120 and corded, countenance exceedingly anxious, blood with inflammatory buff, bronchophony and bronchial respiration marked, dulness over lower half of left lung

behind and fine crepitation in other parts of it ; a coarse rhonchus is heard, and the vesicular murmur absent in lower half of left lung.

The patient being unable to sit up, and death apparently impending, the ligatures were then applied on the upper part of each thigh.

As soon as they were fastened, she complained of weakness and sick stomach. The pulse became softer and less frequent, the skin relaxed.

She complained of numbness in the legs in an hour after the ligatures were applied, and the limbs were much gorged.

The medicine was stopped and the case left to the ligatures alone. They were kept on twelve hours, and during that time she got three hours' sleep, the first sleep since her attack. The pulse was 100 and soft, the skin soft and natural, tongue moist, countenance cheerful and bright, and she said she felt much better. The lungs gave better symptoms to auscultation.

The ligatures were renewed, to be kept on until painful. Next day she was better, coughed and expectorated freely. The treatment by ligature was kept up, being once kept on fourteen hours at a time. They kept down the pulse and kept the skin in good condition. She steadily improved without medicine, using only barley water, and was well on the seventh day after medicine had been dropped to rely on ligatures alone.

What, then, is the power of Hæmostasis by ligature? I have no doubt there are a great many congestions and inflammations which Hæmostasis alone will cure without medicine. It is properly applicable to every case of inflammation and congestion which is not in the limbs, and pre-eminently useful in pneumonia, pleurisy, erysipelas, inflammation of the brain, meningitis, hepatitis, peritonitis, inflammation of the bowels, cerebro-spinal meningitis, and other affections of the brain.

In the practice of surgery, too, it is of immense value, for it enables us to hold the blood under control and reduce hæmorrhage to a mere trifle.

In the amputation of a limb it is the duty of the surgeon to drive out the blood that little or none may be lost by the amputation. A bandage firmly applied from the very extremity may so thoroughly expel the blood that we may almost say none is lost, and the constitution will therefore be more plethoric than before the amputation.

But in operations which do not admit of this precaution, Hæmostasis efficiently applied will so effectually reduce the force of the circulation as to prevent any serious hæmorrhage — the vessels readily closing when the impulse of the blood is slight. In hæmorrhage from wounds or rupture of blood-vessels, Hæmostasis by ligature is a prompt and convenient remedy.

Uterine hemorrhage, it is well known, can be promptly controlled by compressing the abdominal aorta. Baudelocque was honored by the French Institute for the suggestion of compressing the abdominal aorta in cases of uterine hemorrhage, an operation which not only suspends the hemorrhage but rouses the patient by restoring blood to the general circulation. Uterine hemorrhage could also be diminished or suppressed by Hæmostasis on the limbs sufficient to reduce the force of the circulation.

I do not know to what extent my pupils have practised Hæmostasis, but the following statement from one of them is a good illustration of its value : —

"Having heard from your lectures in the Institute an explanation of the principles and practice of Hæmostasis, I have since endeavored in my practice to apply that measure to the relief of my patients, with remarkably satisfactory results. In epilepsy, puerperal and other convulsions, and especially such as seemed to require depletion and were not in a condition to receive anything into the stomach, I have found it most applicable. In such cases the ligatures appeared to make a greater impression than antispasmodics, depletion, or any other agency. I have applied the ligatures in a number of cases which I believe would have proved fatal if that measure had not been used. I have employed the ligatures until the convulsions were arrested, when I would loosen them, and if there were any symptoms of returning convulsions, would tighten them again. In this way I have sometimes retained the ligatures on the limbs for twelve or twenty-four hours without intermission. The continuance of their use for this length of time did not appear to produce any bad consequences whatever. The congestion in the limbs was soon relieved by the course of nature. At the same time that the ligatures were used I employed cathartic evacuants, footbaths, and antispasmodics, but found the ligatures of more value than all the other means.

"After the convulsions were arrested by the ligatures I found the continued use of the antispasmodics, with some tonics, successful in preventing their tendency to return.

"In the case of a girl of eighteen with epileptic convulsions, I used as antispasmodics the sulphuric ether, valerian, castor, macrotys, asafœtida and lobelia, with cathartics, without any decided success in controlling the symptoms, and it appeared probable that the result would be fatal, when I resorted to the use of the ligatures, which arrested the convulsions at once. As soon as the ligatures were loosened the convulsions manifested a disposition to return, and they were therefore kept upon her limbs for about thirty-six hours, which completely arrested the convulsions. After this, by the use of macrotys,

valerian, and lobelia, together with some tonics, she was effectively cured.

"Since I have adopted the practice of Hæmostasis I have resorted to its use in all convulsive cases that appeared to require it, and invariably with success. I have also used it with satisfactory results in some inflammatory cases, in which it evidently contributed to remove the congestion and lessen the determination of blood to the inflamed organ. WILLIAM BEVIER.

"Salem, Steuben Co., Indiana, *June* 21, 1851."

There are other mechanical means of controlling the circulation. Undue determination to the brain may be easily controlled by compressing the carotids. When due to hypertrophied conditions of the heart, it may be controlled by quieting the heart through the brain or the shoulders, if sufficient impressibility exists, or by a sedative medicine such as cereus.

Acting upon the jugular veins has a different effect. All compression of the jugulars is oppressive, producing congestion and inviting apoplexy by the congestion and the softening effect of venous blood. Hence the injurious effects of tight cravats and collars. Compressing one jugular vein is not so injurious, as it tends to increase the flow through the other. Rapid manipulation down the jugulars has a remarkably fine effect, relieving the brain of oppression, clearing the mind, relieving mental oppression and headache.

In the practice of Hæmostasis it is essential that the blood-vessels should be in a distensible condition, and that the volume of blood should not be sufficient to distend the vessels; for if the vessels are already tightly filled with blood, and their structure too firm to yield, but little change could be made by ligatures, and the operation would be ineffectual. This is the case when the blood-vessels of the limbs are firmly contracted by cold, for the small blood-vessels require but little contractile energy to resist the whole force of the cardiac impulse. It is indispensable, therefore, that the limbs should be thoroughly warm; but even when warm, the constitutions of some subjects are so firm that the blood-vessels resist expansion more than is desirable, and sedative, relaxing treatment may be required. The warm bath will be valuable, and a nauseating dose of lobelia or ipecac will be a safe relaxant.

The facility of controlling the blood is greater when the patient is anemic, and if he combines anemia with soft distensible tissues, it will not be difficult to cause him to faint by the ligatures. It will be desirable, if the patient is at all plethoric, to reduce the volume of his blood by diuretics and sudorifics or even hydragogue cathartics.

When the volume of the blood is thus reduced and the patient in a warm, relaxed condition, Hæmostasis is very potent, and I am confident that if all other remedies had been abandoned in the treatment of pneumonia, relying upon Hæmostasis alone, the mortality would have been less than it has been.

The method of Dr. Buckler was the same as that recommended by Mr. Kellie, a naval surgeon, at the close of the last century, as a preventive of intermittent fever. In Duncan's "Medical Commentaries" for 1794 he published several instances in which he had used it with success. "He applied the instrument to the arm of one side and the thigh of the other." Experiments were made early in the 19th century by Dr. Robonam in the use of circular ligatures against intermittent fevers, with a favorable result. "The ligatures were applied to the arm, and made sufficiently tight to interrupt the superficial circulation and retard that of the more deep-seated vessels. As soon as the extremities began to redden, the patient felt easier and the symptoms of the approaching paroxysm abated, the cold and trembling ceased, the pulse became more free, etc. Nearly in all the cases Dr. R. found two or three applications of the ligature were sufficient to suppress the fever." He considered the beginning of the cold stage the best time for the application, when they were nearly sure to suppress the attack. In the middle of the paroxysm they had much less effect. It was sometimes necessary to loosen the ligatures in consequence of producing syncope.

Notwithstanding the long-continued neglect of Hæmostasis by the profession, Hæmospasia was prominently introduced in Paris by M. Junod, beginning in 1833, who used the pneumatic method, and was twice favorably commended by the Academy and the Montyon prize awarded twice.

PNEUMATIC HÆMOSPASIA.

While mechanical Hæmostasis is so convenient, prompt and effective, it is far-inferior in value to the Hæmospasia by modifying atmospheric pressure. This has long been practised on a small scale by dry cupping, which has a marvellous efficiency in relieving circumscribed neuralgia, pain, or inflammation, wherever there is a surface suitable for cupping.

The first application of the pneumatic method on a larger scale was by Dr. Junod, of Paris, who, a few years before the experiments of Dr. Buckler, constructed a metallic boot to take in the leg and draw the blood into it by the suction of an air-pump exhausting the air from the boot, an India-rubber band making a close fit between the top of the boot and the leg.

The "British Journal of Homœopathy" gave an account of Junod's operations and of a case attended by Hahnemann, who had tried homœopathic treatment for nearly a year without success, and finally called in Dr. Junod with his pneumatic apparatus, of which he had a high opinion.

The patient was a young English lady, daughter of an earl formerly an ambassador at a European court. The Journal says:—

"This lady had long been affected with a most curious and sad disease. She had entirely lost the use of her limbs, and lay constantly on a couch, her head generally supported by an attendant's arms. She seemed to be entirely destitute of any power of volition, never spoke except when roused, lay constantly in a half-comatose state, the face being very much flushed and the head very hot. Evidently she labored under severe congestion of the brain. She was under Hahnemann's treatment; he went to see her very frequently, in fact was in almost constant attendance upon her, but was unable to produce any favorable result; and after nearly a year of ineffectual homœopathic treatment, Hahnemann called in Dr. Junod to his assistance. When they met together beside the patient, Hahnemann said, "Now, Dr. Junod, you shall operate on the legs and I on the stomach." After the first application of the boot the patient roused up, addressed those around her, and chatted familiarly and quite sensibly with her friends; her face assumed a natural color, and to the surprise of all she was able to walk about the room, a thing which she had not done for a very long time. After ten applications of the boot, in ten successive days, the patient was perfectly cured and was able to travel into the country, where she remained perfectly free from all symptoms of her former complaint and was able to take a considerable amount of walking exercise."

In my medical lectures at Cincinnati I continued to urge the importance and practicability of pneumatic Hæmostasis on a large scale, and at length two physicians at Lexington commenced the construction and use of apparatus calculated to take in not only a single limb but the entire person, and every separate organ or portion of the surface.

When the whole person is taken in, leaving out the head, it withdraws the circulation from the head and produces an invigorating influence on the constitution, which has been highly beneficial in paralytic conditions and in intermittent fever. The pneumatic treatment has been introduced successfully in several cities by physicians who have made it a specialty, and its beneficial effects have surpassed all expectation. It is very successful in neuralgia or local pain, in tumors, and in paralytic affections. The diversity of

its successful applications is so great that we are compelled to regard it as a general stimulant to vitality, operating by diminishing the resistance to the circulation and thus increasing the vital energy of every organ to which it is applied; consequently restoring or developing organs that are impaired, and, if powerfully concentrated on any region of the body, giving that region a predominance in the vital functions; as, when applied upon the leg, developing functions which antagonize inflammation and active diseases.

The rationale of pneumatic treatment, either for relieving congestion or for stimulation and invigoration, is not mysterious. By diminishing the atmospheric pressure we diminish the friction of the circulating blood, and thus promote the circulation through the part, while we also draw the blood from other parts. The cupping glass applied over any morbid part draws the blood from it to the surface, and thus diminishes the congestion of inflamed organs, enabling them to recover a normal condition.

Diminishing the entire pressure of the atmosphere, as when we ascend a mountain, facilitates the circulation throughout the body, thus producing the feeling of exhilaration that most persons experience on mountain heights and which we also experience in the diminished atmospheric pressure that precedes a storm; an exhilaration that is shown in the sprightly movements of our domestic animals as a storm approaches. This is due to the stimulation of the nervous system, especially the brain.

According to the laws of Pathognomy there is a correspondence between the upper regions of the body and brain and the upper regions of the atmosphere. The same correspondence exists between the lower regions of the atmosphere and the lower regions of the brain and body. That is to say, the lighter condition of the higher atmosphere is congenial to the brain and lungs but not to the muscles. The lungs expand greatly, the carbonic acid escapes more easily, and the brain has a clearer and brighter condition — a condition favorable to health and the nobler elements of character. The heavier pressure of the lower strata is favorable to the animal functions — to muscularity and digestion, but not so favorable to the brain. This effect becomes still more marked as the compression increases, and the opposite effect as it diminishes. Hence we may go so high in the air as to prostrate entirely the physical constitution or descend so low as to oppress the brain. At the height of three miles the atmosphere loses half its weight or pressure, and human beings lose nearly all their strength. A balloon may ascend so high as to be fatal to its passengers — which

was almost realized in a high ascent by Mr. Glaisher. He was in a state of paralytic helplessness at a height of 37,000 feet.

On the other hand, by descending under the water in diving-bells or caissons men may work vigorously, but there is an oppression of the brain liable to result in paralysis, as was proved in the submarine work when the St. Louis bridge over the Mississippi was constructed. The supervising physician himself had a brief attack of paralysis from entering the caisson.* We may therefore produce important effects by either condensed or rarefied air.

The extensive submarine constructions in France, England and the United States have furnished abundant facts confirmatory of the principles of pathognomic science — the law that elevation in the atmosphere (with diminished pressure) corresponds to the nature of the brain and nervous system, depression (with increased pressure) to the nature of the muscular and abdominal functions. Thus the men in the caisson structures worked with ease, and could ascend the ladders or stairways with ease under the increased pressure, but, when the ascent was made, after they had gotten out of the condensed air it was very fatiguing and injurious.

The damaging effects upon the nervous system produced by excessive pressure may serve to indicate by antithesis the beneficial effects of a lighter atmosphere. These were oppressive congestions of the brain and spinal cord, paralysis of sensation and motion, and severe neuralgias, chiefly of the lower limbs and lower part of spine, but sometimes including the upper limbs, the nasal and maxillary regions. These are affections in which pneumatic treatment has proved especially beneficial. Mental dulness, incoherence of speech, stammering, a tottering gait, impairment of taste, smell, and touch, are among the symptoms reported in France; fifteen per cent. of the patients at New York were paralyzed, and 61 per cent. under the heavier pressure at the St. Louis bridge.

Whatever antagonizes the brain must also antagonize the surface, as I have shown in the pathological illustrations. Accordingly we find the enormous pressure of the caissons — thirty, forty, or more pounds to the inch — produces a pale, bloodless condition of the surface. The face shows its pallidness for at least fifteen minutes after coming out of

* The effects of heavy air pressure were tested at the construction of the St. Louis bridge, the caissons being sunk until a pressure of fifty pounds to the inch was produced. Thirty out of 352 workmen were seriously affected, and twelve of these died. Half of these, however, were persons not fit to undergo the exposure. The effect of the pressure, when too long continued, was debility ending in paralysis. Paralysis of the lower limbs appeared in some on reaching a depth of sixty feet; the paralysis sometimes affected the arms also, and sometimes the bowels and sphincters. The superintending physician, Dr. Jaminet, descended over ninety feet, remaining two hours and three quarters, and was dangerously attacked soon after reaching home. Experience showed the necessity of reducing the time the men were under pressure, and it was finally reduced to one hour.

the pressure. The hands have a shrivelled appearance, the veins disappearing. A very troublesome itching of the skin has been frequently mentioned as a common complaint.

Young men of strong, compact constitutions have endured the heavy pressure of the caisson with very little injury, by going in and coming out slowly, but those more advanced in life have suffered much more, and those of a stout, corpulent habit have suffered far more than those of a spare habit, in whom the nervous system has a relatively greater control of the constitution.

That the "caisson disease," as it has been called, was due to the injury of the nervous system by enormous pressure was shown not only by the cerebral and spinal congestions observed, in the autopsies, but by the character of the remedies. Hot coffee and nourishing food were recommended to the laborers. Strong stimulants were used at St. Louis, and morphine was relied upon at New York, though ergot was also used on account of its power over the brain and spinal cord, to relieve their congestions.

The moral to be derived from these observations is that while the low valleys and the seaside or sea-voyage may favor the digestive and muscular system, the highest tone of health and best condition of the nervous system and lungs will be attained on the highest inland elevations, and a plateau elevated from two to five thousand feet above the ocean will prove the most desirable residence.

Those in whom the nervous system has been active, but the muscular and digestive at fault, may be benefited in lowland situations on the sea-shore and by sea-voyages; but those in whom the nervous system alone is exhausted and oppressed, will find restoration in the mountains, which are generally beneficial to those in whom the upper portion of the brain is large.

Working under the heavy pressure of thirty to sixty pounds to the inch, a great increase of appetite and digestion was experienced, and the urinary secretion was notably increased. Cases of dyspepsia were benefited, and the pulse was made slower. But the nervous system suffered as much as the animal functions were stimulated. A pressure of about a hundred pounds to the inch proves fatal to small animals, and the pressure in the caissons at the St. Louis and New York bridges was fatal in a number of cases. The damaging effects were realized in the nervous system, in congestions of the brain and spinal cord, severe neuralgias, and paralysis. In some cases there was congestion of the lungs, one of which was suddenly fatal.

The pulse, which corresponds with nervous excitability, is sometimes checked by the pressure. M. Pol, in descending into a mine

at Douchy, found his pulse sink from 70 to 55 per minute, and on coming out to rise again to 85. But as a general rule the increased resistance or friction of the circulation under a heavy pressure produces an embarrassment which compels a more forcible action and a hardening of the pulse almost to a wiry character which corresponds to muscular action. Under the diminished pressure of higher altitudes, the pulse loses its muscular character and becomes softer and more frequent, while the heart freed from obstruction propels the blood with greater ease, animating each organ, until the pressure is reduced too low.

That increased atmospheric pressure promotes the energy of the muscular system, but reduces that of its antagonist the nervous system is demonstrable in the ordinary phenomena of life. Intense muscular action produces great pressure of blood and energy of cardiac action under which the brain receives an increased pressure, but is also exhausted by the muscular action. The best action of the brain is when it is relieved from this pressure by a state of tranquillity which suits its higher powers, while a state of pressure is suitable to the passions and to muscular exertion. Tiedemann made a very perfect demonstration of this by experiment on the hearts of frogs. He placed the heart of a frog, freshly cut out of the body, under the receiver of an air-pump, withdrawing the air; the pulsations became weaker and slower, and in thirty seconds ceased. (For the same reason the vigor of the heart fails when we ascend two and a half or three miles.) Five minutes later, air being admitted, the pulsations were renewed. This experiment was several times repeated, with the same result. A heart suspended in the air continued in motion for an hour. Under pressure from the air-pump, the action of the heart became stronger and quicker. "Under three atmospheres it beat strongly for twenty minutes, and continued to beat for more than an hour when removed from the air-pump."

Since my attention has been given to the labors of Junod, whose apparatus for Hæmospasia does not arrest the circulation, I find in his practice not only a grand therapeutic method, but a very successful demonstration of what I have claimed for the subhuman power of the extremities as a refuge from fever and inflammation — from cephalic and pulmonary diseases. His achievements certainly entitle him to rank among the greatest benefactors of therapeutic science, and they have been duly honored, his method having been recommended to all hospital establishments of France by a ministerial decree in 1843 — a fact which renders its neglect in the United States highly discreditable. His methods embraced not only Hæmospasia, bnt baths of compressed and rarefied air. He began experiments

in 1829 with a chamber for applying compressed and rarefied air. His experiments indicated that a rarefaction reducing the pressure of the air one fourth was generally the best application, as beyond this it produced the debility of high mountain locations.

In treating a case of meningitis, considered hopeless, which had been sent to him by a physician, it occurred to him to try the reduced pressure locally on the leg. Two treatments wrought a cure, and thus he was introduced to the wonders of Hæmospasia. With this new idea he visited many hospitals and colleges for its introduction, meeting with great success. His views were presented to the Académie des Sciences in six valuable papers, in which he showed the superiority of Hæmospasia to bloodletting and some other fashionable measures. "Finally," he says, "I showed how to produce abundant perspiration by lowering the internal and external temperature of the body, instead of raising it —a resource hitherto unknown in therapeutics." In 1854 a favorable report was made on the use of his method in cholera, and a gold medal awarded him. In 1851 he visited Great Britain and successfully introduced his methods in the hospitals. He was active at London and Constantinople in introducing his measures during the prevalence of cholera, and in 1870 his second Montyon Prize, the grand prize of medicine and surgery, was awarded. This imperfect statement of the recognition of his modest labors is sufficient to show that we may trust implicitly his reports of their success. He is the very opposite of a boastful pretender, and has received the most emphatic commendation from the eminent members of the profession at Paris. We find among those who have given him their complimentary indorsement the names of Andral, Bouillaud, Velpeau, Nelaton, Rostan, Ricord, Malgaigne, Royer, Louis, Bricheteau, Berard, Dubois, Baudelocque, Leuret, Cruveilhier, Trousseau, Piorry, Cazenave, Boyer, Voisin, Solon, Baron, Girardin, Labrie, Piedagnel, Chassaignac, Legroux, Gibert, Hortiloup, Honoré, Blandin, Gerdy, Guersant, Devergie, Sandras, Robert, Jobert de Lamballe, Blache, Richer, Rayer, Nonat, Briquet, Barth, Monod, and Fouquier. The majority of these names are familar to English as well as French physicians.

We may therefore recognize the reports of the application of Hæmospasia as a matter of science which is no longer under any degree of doubt, and upon which we may act with the utmost confidence, and I take great pleasure in quoting this experience; for what I have discovered and taught as Sarcognomy, though it may be demonstrated science, has not yet passed beyond the circle of my pupils to receive the indorsement of professional authority, because I have not engaged in its propagation; hence the confirmation of my doctrines by pneumo-therapia will be interesting to my readers.

Sarcognomy affirms that below the knees we have a concentration of cooling, sedative, antiphlogistic and soporific power, calculated to diminish the activity of the brain and nervous system, the respiration, circulation, calorification, and all inflammatory or febrile processes, and that whenever the vital force or the circulation is drawn below the knee, all inflammatory or febrile conditions must be reduced and all active processes of brain, lungs or heart. The pulse must be reduced and the temperature of the skin; and the relaxation of the brain must produce a relaxation of the skin, since it corresponds in its conditions with the brain.

All this has been very thoroughly demonstrated by Junod with his hæmospasic boot, which operates below the knee, concentrating an extreme hyperemia of normal blood in the leg and thus developing its predominance in the functions of life.

He claims to be able to introduce 113 ounces of additional blood in the legs by applying his boot on both, and describes an enormous increase in the size of the leg under the cupping process, though it is usually limited to reducing the pressure one fourth. What is the effect of this reduced pressure and hyperemia? He thus describes the effect of the application of one boot on a healthy subject: "The face becomes pale, the temperature lower, especially in the upper parts of the body, the breath is cooler, the inspirations deeper, the voice weaker." Next "the volume of the pulse is diminished by one half." The leg is greatly swelled and red, with "a sensation of local heat and itching." The pulse becomes thready, the voice weaker, "the chest gives out a hollow sound on percussion," "constant yawning." There is a slight perspiration, the pupil is dilated, "the eyes dim, taste and smell nearly gone; sense of touch dulled; the hearing confused by ringing in the ears." The ears are extremely cold, "the tongue is colder and clammy," the axilla reduced two degrees in temperature. "He feels so feeble that he can scarcely raise his arm." At length the "pulse can no longer be felt, but the beating of the temporal artery is still to be distinguished." Then "the pulsation of the temporal arteries has become imperceptible, and fainting ensues." But he is readily restored by allowing the return of the air. From the beginning to the fainting occupied an hour and forty minutes, the last twenty-five minutes both limbs being operated on. The swelling of the legs is accompanied by a sensible diminution in the upper part of the body measured at the waist. There was still some increase of the legs perceptible the next day.

That in this case there was a development of vitality in connection with the hyperemia of the legs, such as always goes with increased circulation, was distinctly stated thus: "There is a great

increase of vitality in the extremities submitted to the action of Hæmospasia. The skin reddens in the capillaries." The blood which accumulates in parts submitted to the action of Hæmospasia is chiefly arterial. If rarefaction is carried to a high degree, the principal veins will gradually disappear and give place to the capillaries, which press upon them on all sides." It is for this reason that Hæmospasia has the remarkable property of acting favorably on varicose veins!

Thus does Hæmospasia give for the time being to the vitality of the leg a control over the general vitality; as any organ in the brain or elsewhere becomes, in a hyperemic condition, dominant over anemic organs. And as Hæmostasis does this much less effectively, since it obstructs the circulation, it is evident that Hæmospasia is greatly preferable, for it is not abnormal, but nourishes and strengthens the parts to which it is applied, and is consequently useful in producing a full development of organs that have declined or atrophied, though Junod does not refer to this important fact.

He gives an ample statement of cases in practice, which is so important and interesting that I am almost tempted to copy the whole 293 cases, which occupy 160 pages of his book, as the most triumphant illustration of Sarcognomy which could be presented. But for want of space I shall confine myself to the descriptive titles and a few specimen cases as illustrations, hoping thereby to interest the students and practitioners of Sarcognomy in the practice of Hæmospasia and perhaps in the reading of his book or calling for an American edition, as it was printed for private circulation. It was entitled "A Theoretical and Practical TREATISE ON HÆMOSPASIA, by V. T. JUNOD, Docteur en Médecine de la Faculté de Paris; Deux fois Lauréat de l'Institut de France; Premier prix Montyon en 1836; Grand prix de médecine et de chirurgie en 1870; Membre correspondant de la Société médicale de Londres, etc.; Prix Barbier 1,500 francs en 1876. Translated from the French by Mrs. E. Harley Palmer. LONDON: Printed for private circulation only, 1879."

I trust the reader will not fail to read carefully this catalogue of cases successfully treated by the hæmospasic method, which reduces the human constitution to its subhuman conditions, in which the capacity for active disease is lost, and in which a method is presented which Sarcognomy authorizes and will modify and enlarge in its application.*

* GLOSSARY OF THE MEDICAL TERMS FOR THE BENEFIT OF NON-PROFESSIONAL READERS.

Amaurosis. — Loss of vision from impairment of the optic nerves.
Amblyopia. — Incomplete amaurosis.
Amenorrhœa. — Deficiency of the menses.
Angina. — A disease with sore throat or sense of suffocation.
Angina pectoris. — Severe pain and suffocative feeling in the region of the heart.

Catalogue of Successful Hæmospasic Practice.

Maladies of the Cerebro-Spinal System. — 5 cases of apoplexy; 17 of cerebral congestion; 2 of aphasia; 7 of paralysis; 2 of spinal disease; 5 of meningitis; 1 of softening of the brain; 1 of cephalalgia.

Nervous and Neuralgic Affections. — Convulsions, 8 cases; hysteria, 3 cases; epilepsy, 4 cases; loss of memory, 1 case; hypochondriasis, 1 case; mania, 8 cases; sciaticas and neuralgias, 9 cases.

Affections of Eyes and Ears. — Ophthalmia, 6 cases; iritis, 1 case; keratitis, 1 case; blepharitis, 1 case; falling of the right eyelid, 1 case; congestive amblyopia, 1 case; amaurosis, 11 cases; otitis, 3 cases; deafness from fever, 2 cases; deafness of long standing treated by hæmospasia and baths of alternately compressed and rarefied air, 1 case.

Affections of the Respiratory Organs. — Epistaxis, 2 cases; angina of the tonsils, 3 cases; œdema of the glottis, 1 case; diphtheria of the pharynx, 1 case; croup, 1 case; laryngitis and alteration of voice, 2 cases; bronchitis, 5 cases; acute catarrh and emphysema, 1 case; pleurodynia, 1 case; pleurisy, 7 cases; pneumonia, 15 cases: pulmonary congestion, 3 cases; hæmoptysis, 16 cases; consumption, 5 cases.

Affections of the Heart. — Hypertrophy, 5 cases; heart disease and asthma, 5 cases; endocarditis and hydro-pericarditis, 4 cases; angina pectoris, 1 case; palpitation and nose-bleeding, 1 case.

Affections of the Digestive Organs. — Gastralgia, 2 cases; hæmatemesis, 1 case; intestinal occlusion, 1 case; peritonitis after confinement, 1 case.

Uterine Affections. — Metrorrhagia, 2 cases; uterine hemorrhage, 1 case; dysmenorrhœa, 1 case; suppression of the menses, 2 cases; amenorrhœa, 2 cases.

Urinary Affections. — Nephritis, 1 case; cystitis, 2 cases.

Fevers and Cholera. — Cholera, incipient, 2 cases, advanced, 10 cases; typhoid fever, 11 cases; small-pox, 2 cases; scarlet, quotidian, and intermittent fevers, 4 cases.

Rheumatism and Gout. — Rheumatism, 8 cases; gout, 2 cases.

Surgical and other Affections. — Severe falls, 5 cases.

Head Injuries. — Kick on the head by a horse; gunshot wound; gunshot and meningitis; delirium from a burn; erysipelas, 3 cases; brain affection from amputation; traumatic ophthalmia; traumatic amaurosis; cataract, 2 cases; glaucoma; caries of orbit and chorea; disease of the face; asphyxia, 2 cases; atropine poisoning; wry neck; anthrax; pain in shoulder for two years; dislocation of arm (assisted by hæmospasia); dislocation and sleeplessness; blood poisoning; phlebitis; whitlow; gunshot wound of right hand; scirrhus of right breast; con-

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Aphasia. — Loss of speech.
Anthrax. — An inflamed tumor called a carbuncle.
Arthritic. — Relating to gout or the joints.
Blepharitis. — Inflammation of the eyelids.
Bronchitis. — Inflammation of the bronchia, the air-tubes that enter the lungs.
Caries. — Decay of the bones.
Cephalalgia. — Pain in the head.
Chorea. — Irregular movements; St. Vitus' dance.
Cystitis. — Inflammation of the bladder.
Dysmenorrhœa. — Difficult, disordered or painful menstruation.
Emphysema. — Collection of air in the chest or under the skin.
Endocarditis. — Inflammation of the walls of the heart.
Epistaxis. — Bleeding at the nose.
Gastralgia. — Pain in the stomach.
Glaucoma. — Impaired vision from the vitreous humor of the eye.
Glottis. — The aperture of the larynx.
Hæmatemesis. — Vomiting blood.
Hemiplegia. — Paralysis of one side.
Hæmoptysis. — Spitting of blood from the lungs.
Hydro-pericarditis. — Dropsy and inflammation at the heart in the pericardium.
Hypertrophy. — Excessive growth.
Hypochondriasis. — Low spirits and great anxiety about health.
Icterus. — Jaundice.
Inguinal. — Relating to the groin.
Keratitis. — Inflammation of the cornea of the eye.
Laryngitis. — Inflammation of the larynx.
Meningitis. — Inflammation of the membranes of the brain.
Metrorrhagia. — Hemorrhage or flow from the womb.
Nephritis. — Inflammation of the kidneys.
Œdema. — Swelling of the surface from dropsical effusion.
Pneumonia. — Inflammation of the lungs.
Paraplegia. — Paralysis of the lower portion of the body.
Peritonitis. — Inflammation of the peritoneum, a membrane enveloping the viscera of the abdomen.
Pharynx. — The passage at the back of the mouth and entrance of the throat.
Phlebitis. — Inflammation of the veins.
Pleurodynia. — Pain in the walls of the chest.
Prostatitis. — Inflammation of the prostate gland, below the urethra.
Quotidian. — Daily; a fever recurring every day.
Scirrhus. — A hard tumor.
Strangury. — An obstruction in urinating.
Traumatic. — Produced by a wound.
Urethra. — The channel for the discharge of urine.
Varicocele. — Swelling of the veins of the scrotum or spermatic cord.
Whitlow. — A painful abscess in a finger; a felon.

gestion of the breasts; contusion of thorax, 2 cases; spinal affection with abscess; gunshot wound in lumbar region and paraplegia; traumatic paraplegia; traumatic peritonitis; strangury from tumor; abdominal tumors, 2 cases; chronic prostatic disease; spasm of urethra; irreducible crural hernia; strangulated inguinal hernia; varicocele; contusion of knee; traumatic arthritis; gunshot wound of leg; ulcer of leg; contusion of leg; sprained ankle; frostbite of foot.

It would be impossible to find in the annals of medical science from the earliest ages any single measure to compare for a moment with the vast variety and energy of therapeutic powers which have been developed by Hæmospasia, even if we were confined to the above catalogue. But this remark applies only to the orthodox or fashionable science, which has been sanctioned by colleges. Vital nervauric treatment alone (commonly called magnetic) can show an equally diversified illustration of sovereign power over disease, reaching to many cases and to instantaneous results which are beyond the power of Hæmospasia. But this has been resisted and walled out from the colleges by the invincible powers of mental inertia and professional jealousy; and even Hæmospasia meets the same opposition of inertia, — neglected in America, and even in France, though sanctioned by authority, and collegiate jealousy pacified by the tact of the modest Junod. He has to complain of this neglect, and resorts to the subterfuge of printing his book "for private circulation only," to escape the hostility of professional jealousy, which, under the false pretence of professional ethics, forbids a physician to give his successful experience to the public.

"How is it (says Junod in this book) that a method offering such advantages, which has fixed the attention of the learned profession, obtained for its author honorable approbation and reward, and has been made the subject of several important works, — how is it that this method, known for forty years, is not more generally adopted by the medical profession? [To-day it is fifty-seven years since the formal presentation in Paris of Junod's discoveries.]

"Such is unfortunately the tendency of the human race, which refuses to acknowledge the efficacy of a method which addresses itself to common sense alone, and is divested of all romance or imagination. It is sad. The method is praised and neglected. Its progressive action is acknowledged and it remains in a groove. It is considered desirable that science should move onwards and attain perfection, and yet every new experiment is received with suspicion, and every serious inquiry is rejected. Men prefer to remain stationary, and follow in the old ruts traced by centuries, and from which they will not emancipate themselves. They will *neither accept nor reject* that which may change the ancient usage, or introduce a new element in therapeutics. It has been thus with other inventions. Valuable discoveries have been forgotten or indefinitely postponed.

It is easier to make a discovery and to bring an apparatus to perfection than to get it adopted in a lifetime."

Such language as this reminds us of the experience of Harvey and other great scientific benefactors; but how much more valuable, *practically*, is Hæmospasia than Harvey's discovery of the circulation!

As the foregoing catalogue, by name, of 293 cases is very unsatisfying from the lack of minute description, justice requires that we should look at a few specimen cases to see what they teach.

We observe there are 65 cases of relief to the cerebro-spinal system; 9 of neuralgias; 30 of affections of eyes and ears; of respiratory organs, 58 cases; of the heart, 16 cases; digestive organs, 5; uterine, 8; urinary, 3; rheumatism and gout, 10; fevers and cholera, 29; surgical and miscellaneous, 54.

If this is a criterion of the availability of Hæmospasia, it would seem that its power was greatest over affections of the head and nervous system, which were controlled in 104 cases, next of the thorax, which were controlled in 74 cases. Of fevers and inflammations, — there were 17 fevers and inflammations (counting the rheumatic, urinary, and surgical, which were nearly all strictly inflammatory) 67, — making 84 febrile and inflammatory.

This sustains my claim that Hæmospasia below the knee is the most powerful agent known for the control of active or inflammatory diseases of the head and chest, for no manual or electric treatment can produce so great a change in the balance of the circulation, nor can any combination of drugs approach it in effectiveness. Neither is there anything in common use that so *promptly* controls fever and inflammations wherever located, except where great nervauric power operates on impressible constitutions.

Hæmospasia accomplishes its results by controlling the distribution of the blood, — nervauric treatment by controlling that of the nervous forces. These two are the most successful agents known in therapeutics, and he who handles both is a social benefactor. What the latter can do my pupils are demonstrating; what the former has done may be learned by referring to a few of Junod's cases, which are here given. But Junod's cases fall far short of showing the power of PNEUMATIC SARCOGNOMY, for they illustrate chiefly derivation by Hæmospasia to the sub-human region, while it is applicable to all parts of the body.

"*Apoplectic congestion.* — A princess of the royal family in Italy, aged 60, was seized with apoplexy, accompanied by unconsciousness, loss of movement and sensation, dilated pupils and insensibility to light. For the first six days the doctors (amongst them Cabarrus)

had recourse without success to the usual treatment — bleeding, purging, and revulsives. Under this difficulty I was sent for. A single derivation brought back consciousness, sight, movement, and sensation. Soon after this the Marquis de Brignolles, the Italian ambassador, paid me a visit to say that his Majesty, pleased with this unexpected result, desired to have four apparatuses made under my directions for use in the military hospitals.

"*Cerebral congestion.* — Count ——, aged 34, *receveur des finances*, was affected with cerebral congestion in consequence of too close application to business. He had been unconscious for three days, when MM. Royer and Fauconneau-Dufresne decided to have recourse to Hæmospasia. He regained consciousness under one derivation, and was able to return to his post.

"*Cerebral congestion in a new-born infant.* — A child seized with this affection at its birth was submitted to the application in the presence of M. Monod, who sent for me. In 15 minutes the child recovered, and all danger disappeared.

"*Apoplectic congestion.* — Mad. ——, aged 45, was seized with apoplexy, with complete loss of power and consciousness. She was bled without result, and M. Thierry-Mieg decided to try Hæmospasia. Sent for in the night, I reduced the pulse to a thread, which brought back consciousness and removed the paralysis. A second Hæmospasia the following day completed the recovery.

"*Apoplectic congestion.* — An old soldier, aged 76, was seized for the second time with apoplexy, and was brought home unconscious. A doctor at Vincennes, where he lived, prescribed blisters and purgatives, which had no effect. M. Alphonse Sanson, who was called in for consultation, proposed Hæmospasia. After a derivation which lasted half an hour, the pulse became small, the breathing labored, and a sweat broke out on the forehead. I ceased to act, and allowed this semi-fainting condition to subside. He soon regained speech and consciousness. This one application sufficed for recovery.

"*Apoplectic congestion.* — A doctor, aged 60, was suddenly seized with cerebral congestion, having been quite well on the morning of his seizure, Sept. 3d, 1859. He lost consciousness and movement. M. Valerand bled him, with no result. The following day, after a consultation with M. Sanson, I was called in. After a Hæmospasia of 45 minutes he was able to walk into the next room. The paralysis was cured.

"*Cerebral congestion with delirium.* — A young man of 25, of sanguine temperament and strong constitution, was admitted to the hospital at Nice for a cerebral congestion of six days' standing. Notwithstanding general and local bleeding, delirium had supervened for 48 hours. Called in by M. Deporta, I applied the apparatus so as to reduce the pulse to a thread. In fifty minutes consciousness returned, and in a few days the patient recovered.

"*Apoplectic congestion with paralysis of the optic nerve.*— Mad. ——, aged 48, being quite well the previous day, was seized with congestion of the brain in the night. Loss of mental faculties, loss of sight, affection of the right eyelid, strabismus, and stupor. MM. Goupil and Dagama called me in. The stupor yielded to the first Hæmospasia.

A daily application re-established the sight in four days, the stupor and strabismus disappeared, the eyelids resumed their normal condition, and the patient recovered.

"*Chronic cerebral congestion.* — M. ——, aged 51, corrector of the *Union Médicale* press, was seized with apoplectic congestion. The hemiplegia only lasted a few hours, but he was unable to resume his occupation for a whole year, owing to the excessive congestion of the brain which supervened on the smallest intellectual exertion.

"After undergoing various treatments without result, and trying even hydropathy, he consulted M. Monod, who sent him to me. After sixteen days of hæmospasic treatment, equilibrium was re-established in the circulation and he resumed his work, and is now corrector in one of the principal printing-offices in Paris. He continues in perfect health.

"*Aphasia.* — A doctor, aged 58, had suffered for several years with valvular disease of the heart grafted upon an arthritic diathesis of a very pronounced kind. On the 3d of January, 1868, he was seized with giddiness, lancinating pain in the forehead and temples, and cephalalgia supervening upon the smallest mental exertion. On the 16th of February he was seized with aphasia, the recollection of words failing, without disturbance of any other function. He was bled without result, and his physician was recommended by M. Shuster to send for me. Ten hæmospasic applications were crowned with perfect success, and this recovery has since proved lasting.

"*Apoplexy, loss of speech, mouth drawn to one side.* — A soldier in the infantry, aged 34, was seized in the night with apoplexy and loss of speech, the mouth drawn to one side. He was removed to the military hospital at Chatham. The clinical professor, whose office it was to report upon Hæmospasia to the War Office, profited by this occasion to study its effects. The operation lasted half an hour. The mouth could be seen minute by minute regaining its normal condition, and his speech was restored, to the great astonishment of the surrounding doctors and students. This recovery was maintained.

"*Acute meningitis.* —Chaix, a wood-carver, aged 36, of nervous temperament, had reached the eighth day of acute meningitis when I was called in. I found him in a state of coma, the head thrown back, pulse weak and quick, face animated, skin hot and dry. One Hæmospasia brought back consciousness, the second sufficed to place him in the way of sure recovery.

"*Meningitis from sunstroke.* — Mlle. B., aged 15, after sunstroke from exposure of the head (Sept. 3, 1836), had fever, vomiting, and convulsions, for which her two physicians bled her twice. Getting worse for three days she was bled three times in the arm and once in the foot. Thirty leeches and two blisters were applied to the lower extremities and ice on the head. Five days from the beginning, there was great prostration and frequent convulsions, cold feet, and great heat at the occiput. On the 9th, Dr. Junod being called in reduced the atmospheric pressure at ten o'clock on the lower extremities a twelfth, and then a ninth. In eight minutes there was a slight convulsion of the upper extremities. At 10.15 the reduction of pressure

was increased to a seventh. At 10.20 the ice was removed. The pain was nearly gone, and disappeared entirely at 10.25. The pressure was reduced a ninth. A faint and drowsy condition existed, and the Hæmospasia was discontinued. The improved condition continued through the day and night, and next morning a few moments of Hæmospasia prevented a return of the headache. Three days later she went to her sister's wedding in church, and continued well.

"*Epilepsy for ten years.* — Clemence Caron, at the age of 12, was frightened into an attack of epilepsy, and for this was admitted to the Salpêtrière, 'where for ten years the fits returned every evening at the same time.' 'At the age of 22 she was seized with typhoid, for which she entered the Hôtel Dieu. The epileptic fits, which ceased during the fever, returned upon her recovery. M. Sandras, learning that menstruation had never appeared with this patient, and remembering the special action of Hæmospasia in this, sent for me. At four o'clock, with the double purpose of preventing the attack and establishing menstruation, I acted upon both lower extremities at once. This first derivation succeeded in preventing the fit. The following day, same result. The third was followed by the appearance of menstruation. From that moment the patient was delivered from the fits, and regained perfect health. Two years later, on receiving intelligence of the death of her brother, the epilepsy returned with the same violence and the same periodical character. Clemence was received at the *Hôpital de la Charité*, and I was called in by M. Fouquier. At four o'clock I reduced the pulse to a thread and maintained it in that state till half-past six o'clock. No paroxysm. The following day, same derivation, same result. The next day an assistant who took my place did not act with sufficient energy, and allowed the attack to get ahead of him; nevertheless a hyperhæmospasia assured the recovery. Clemence Caron was subsequently employed for six months as an assistant nurse, which allowed the stability of her recovery to be attested. An epilepsy of ten years' standing, with daily attacks, is generally considered to be beyond the resources of medical art.'"

In a case of epilepsy of four years' standing, in a girl of 18 at *La Charité*, accompanied by amenorrhœa, twenty-one applications of Hæmospasia restored menstruation and cured the epilepsy.

PNEUMONIA. — In four cases of pneumonia "no other means save Hæmospasia were employed, and recovery took place in a few days." They were as follows: —

"*Cecile Benoit*, aged 23, of sanguine temperament and good constitution, was admitted to the *Hôpital de la Charité*. She presented the following symptoms: anxious respiration, frequent cough, rusty expectoration, dulness on percussion under the shoulder-blade, distinct crepitating sound at the point affected, hot skin, strong bounding pulse, 120. The superintendent having ordered Hæmospasia before all other treatment, I brought on artificial anemia in fifty minutes. The skin, which had been burning and dry, became moist. On being questioned as to her sensations, the patient said, 'I feel my skin is stretching.' Perspiration was established, the breathing, completely freed, gave no pain, and the patient, who did not know how to express

the relief she experienced, shortly fell asleep. A second derivation was made the same evening, to induce sweating and for the completion of the cure. In a few days this patient left the hospital completely recovered, having had no other treatment.

"*Louis Corot*, aged 25, of sanguine temperament, was seized with rigors, headache, difficulty of breathing and pain in the side, pulse 120, skin burning, expectoration rusty and viscid. The first derivation took place in the presence of [several distinguished physicians], and from the commencement the respiration became freer. In 50 minutes the headache and pain in the side had yielded and the pulse became thready. Profuse perspiration set in, followed by deep sleep. The derivator having been removed, the patient was quite astonished, on awaking three hours later, at the amelioration that had taken place in his condition. Perspiration was kept up without interruption, by derivations, which were renewed whenever the skin showed any tendency to dryness. In three days the patient was convalescent.

"A man aged 31, in delicate health, was seized with pneumonia of the right lung. M. Godier called me in at once. Three derivations pushed to anemia, brought on a salutary crisis; on the fifth day the patient was convalescent.

"A man aged 54, was seized on the 17th day of December 1858, with pneumonia of the left side, incessant coughs, rusty colored expectoration, dyspnœa and delirium. MM. Despaulx Ader and Caffe decided in consultation to send for me. A first derivation prolonged for 55 minutes calmed the delirium and the cough. After the third, the character of the expectoration improved, and on the fifth day the patient was out of danger.

"*Pneumonia in an aged person.* — Anna Dupont, aged 74, was admitted to the hospital of Geneva on the fifth day of pneumonia, when M. Lombard, considering her case a grave one, and finding that it had not been relieved by other treatment, sent for me. M. Fauconnet was present during the derivation. The stitch in the side gave way in forty minutes. The pulse fell from 130 to 120. Profuse perspiration ensued. The following day a second Hæmospasia was followed by convalescence."

HÆMOPTYSIS. — Nothing is more promptly controlled than hæmoptysis. Of fourteen cases of its successful treatment the following is a fair sample :—

"M. ——, aged 57, an ex-Minister for Foreign Affairs, was seized with hæmoptysis which resisted all general and local bleedings, cuppings and iced drinks, in fact all hæmostatics. In a consultation between MM. Andral, Roan and Charran, Hæmospasia was prescribed. The hemorrhage yielded to the first derivation and the patient recovered."

"M. ——, aged 18, had in three weeks 17 attacks of blood-spitting when M. Thierry Mieg prescribed Hæmospasia. After the second derivation the bleeding which had brought the patient to death's door ceased, and he recovered."

CARDIAC DISEASES. — "*Asthma with organic disease of the heart.* — A well known doctor in London, aged 60, was affected with asthma,

connected with organic disease of the heart. The paroxysms succeeding each other rapidly and resisting all remedies, he decided to try Hæmospasia and summoned me by telegram. On my arrival I found him in an alarming state; he had not been able to get into bed for a fortnight, and extreme lassitude was therefore added to his sufferings. From the beginning of the first Hæmospasia the breathing became freer, and in 35 minutes he was sufficiently relieved to go to bed, though I had him carried there in order to save all exertion. The derivations were renewed for three days to prevent a return of the attacks, which they effectually dispersed."

"*Acute rheumatism and endocarditis.* — A young man, aged 22, was affected with acute rheumatism, when suddenly symptoms of endocarditis supervened, characterized by great oppression and increase of the beating of the heart. Pulse small, rapid, irregular, with very little reaction. Other treatment having failed, Hæmospasia was tried, without going so far as fainting. I made an energetic derivation which restored calm in 45 minutes. I renewed the derivation in the evening, so as to assure repose for the night, and to prevent a return of the complication. The next day a fresh derivation relieved the joints of the upper extremities, and the patient recovered." Speaking of rheumatism, Junod says: "I have seen rheumatism of the shoulder yield completely to a single Hæmospasia on the affected part, though it had resisted all other treatment."

"*Hypertrophy of heart.* — The preceding case decided M. Beaugrand to send a young man aged 21 to me, who was suffering from hypertrophy of the heart. He was a harness-maker by trade, which was greatly against him, owing to the strength of arm required. After 35 days of continued treatment he recovered.

"*Endocarditis.* — A young girl of 17, admitted to University College Hospital, London, had been suffering for some days from articular rheumatism which involved the heart. Leeches had produced no effect. Dr. Walsh begged me to try Hæmospasia in her case, which at once freed the heart and brought her recovery. Dr. Walsh was the means of introducing the apparatus into the London University College Hospital."

CHOLERA. — "*Cholera, cold stage.* — Being on duty on the 12th June, 1848, at the cholera station belonging to the parish *Rue de l'Union*, I was called in to a patient who had been seized in the street with giddiness. The next day after suffering from colic during the night, with liquid evacuations, she was attacked with the usual vomiting and the stools became white. The pulse was almost imperceptible, pulsations 90, seltzer water given as a drink was almost immediately rejected, and the same thing happened with all the medicines given. The voice was becoming weak, the tongue cold, and the extremities were gradually taking a blue tinge. Shortly after, cramps set in, and the patient exclaimed, 'Take away this pain which is killing me!' I made a derivation on the lower limbs. The pulse, already feeble, decreased. Notwithstanding this, I persisted with the derivation until calm was established. The derivation lasted two hours. The leg on which the boot was applied became nearly black. The sweat, at first cold, gradually became warm, and

extended over the whole body. The patient recovered. At the beginning of the derivation I placed two hot bottles close to the recipient; there can be no doubt that caloric is of use in the treatment of cholera."

[The leading feature of the Eclectic treatment of cholera in 1,500 patients at Cincinnati in 1849, was wrapping the patient in blankets wrung out of water as hot as could be handled. The mortality was less than six per cent.]

"*Cholera, blue stage.* — A woman, aged 44, seized with the epidemic, was admitted on the 21st of August, 1854, to the hospital of St. Dizier. The pulse, 102, was scarcely to be felt. Evacuations characteristic and frequent. The whole body was blue, or rather of a coppery red, the eyes deeply sunken, and the voice feeble. The patient begged for air, Hæmospasia was suggested by the head surgeon and applied in his presence. The patient's countenance improved, the breathing became free, the headache and stupor disappeared, and perspiration being established, the derivation was completed in 45 minutes. On the 22nd the leg which had been subjected to derivation slowly returned to its natural condition, the perspiration became established and the evacuations finally ceased."

FEVERS. — "A soldier, aged 27, had suffered from intermittent fever in Africa, with engorgement of the spleen. He was sent back to France and entered the hospital at Chaumont the 20th of September, 1854, for typhoid accompanied by intense dyspnœa, strong reaction and brain affection. The head surgeon applied to me. A single Hæmospasia sufficed to relieve the breathing and the brain symptoms, and to reduce the vertical diameter of the spleen by 3.14 inches, and the transverse diameter 1.57 inches. No fresh complication rose.

"Case 221. — A patient, aged 19, was affected with typhoid on the 3rd of May, 1857. At first it was slight, but at the end of a fortnight grave symptoms sat in. On the 17th the expression altered, the patient complained of suffocation; respirations 34; cough dry and fatiguing; dulness on left side; pulse 125; temperature 105 degrees. The tongue dry and bright red at the tip; heavy sleep and delirium at night, picking of the bed-clothes. On the back of the legs were dangerous ulcers produced by mustard plasters. M. Monod being called in advised Hæmospasia and I was sent for. I placed a band round the leg, so as not to hurt the sores, and applied the derivation on one of the lower extremities. After 45 minutes the respirations fell from 34 to 21; the oppression yielded; temperature 102.2 degrees. In the evening at 8, fresh Hæmospasia was made on the opposite leg. On the 18th, the breathing remained free and there was no return of delirium. Another Hæmospasia that evening. On the 19th convalescence set in.

"Case 212. — A young person in a school at Geneva was seized with typhoid, and was attended by M. Coindet. For eight days both cold affusions and other means had been employed to subdue the delirium, but in vain. My colleague hearing I was in town sent for me. The derivation removed the delirium in 50 minutes, and the patient was out of danger. M. Coindet being struck with the power-

ful effects of this method, had an apparatus supplied to the asylum of which he had charge.

"Case 213. — Typhoid fever. Mlle. ——, aged 15, was seized with delirium on the fifth day of fever when in a warm bath. M. Chomel being called in, proposed Hæmospasia. A single derivation sufficed to restore consciousness, and the fever followed its regular course towards recovery.

"Case 214. — While at Lausanne, I was consulted for a young school girl, aged 19, suffering from typhoid; M. Delaharpe acted with me. Hæmospasia was the foundation of our treatment. The first derivation dispersed the delirium, though we used others to prevent a return. On the 6th day all active measures were dispensed with and the patient became convalescent.

"In intermittent fevers (says Junod) the return of an attack can often be prevented by a Hæmospasia applied an hour before the attack." He observes that *in all eruptive fevers*, when the eruption fails to appear or having appeared disappears, the pulse becomes small and rapid, the skin dry and the nervous system greatly oppressed. "Such a state alarms even the cleverest doctors. They use emetics, sudorifics, or stimulating applications to draw the circulation back to the surface, some even resort to bleeding, and cold water douches or compresses, but all in vain. In such circumstances Hæmospasia shows its efficacy. It frees the nervous centres, relieves the organic depression, causes a flow of blood through the tissues and brings back the rash with surprising facility. In erysipelas it is not necessary to wait until it has fully manifested itself, for it can be prevented from running its course by anticipatory applications of Hæmospasia."

We must pass by the numerous illustrations of the power of Hæmospasia in surgical cases and various inflammations, for it is unnecessary to continue these quotations further to show the great power of Hæmospasia. It is a magnificent illustration of the laws of Sarcognomy, and ought to be familiar to every student.

Cases still more remarkable than those quoted from Junod can be furnished by other practitioners of the pneumatic treatment. Dr. C. M. Newell of 1074 Washington St., Boston, has been actively engaged for twenty years in this pneumatic practice and has performed more remarkable cures than any I have quoted from Junod, some of which are stated in his pamphlet on Pneumatic Therapia. But finding the medical profession indifferent to Pneumatic Therapia, he has not attempted to force his knowledge on those unwilling to learn. I have quoted from Junod because he has so stable a reputation, so ample an indorsement by the most conservative and distinguished physicians. But every energetic practitioner of pneumatic treatment in an enlightened manner will be able, like Dr. Newell, to surpass in some respects the record of Junod; and the votary of Sarcognomy who applies its principles will show himself very inefficient if he

does not in a few years accumulate a more brilliant record than that of the distinguished Frenchman, who knew not the whole power of pneumatic treatment.

Sarcognomy shows that what has been done on the sub-human region of the human body can be done on all other parts with the same logical result — the development of the local function already determined by Sarcognomy. Consequently the pneumatic treatment can play upon every key of the human instrument through the circulation as it is played upon by electric and nervauric practice, though it is incapable of the same specific minuteness of application because it requires a larger space and is also resisted by the bones of the cranium. Had Junod understood the basic principle of Sarcognomy, he might have made a satisfactory demonstration of the science by pneumatic experiments to develop local functions.

Whoever is determined to excel in the relief of disease should have at his command the nervauric, electric and pneumatic therapeutics, each of which can accomplish something peculiar which the other methods cannot, and the whole of which guided by Sarcognomy may accomplish more than the therapeutics of the old colleges. Let us consider now the various applications of pneumatic Sarcognomy.

Leaving the sub-human region below the knee, we shall find not a sedative but an invigorating region from the knee to the trunk, which is one of the most powerful tonic invigorators we can bring to bear to develop muscular energy and vital force. It is desirable that the cupping should be extended above the head of the thigh-bone, so as to fully include nutrition and vital force on the thigh, but it should keep a few inches above the knee to avoid its restless influence unless we desire that peculiar stimulation. When the entire limb (thigh and leg) is included, we gain great vital force in combination with the sedative anti-inflammatory character of the leg and foot by a moderate derivation: for the larger the territory included, the more moderate should be the suction. This whole limb treatment therefore is valuable in consumption, which needs both reaction and invigoration. But where there is little active disease, the thigh alone will give the needed invigoration.

This CRURAL STIMULATION has a wide range of application to all cases of reduced vitality and emaciation, consumption, anemia, paralysis, convalescence from severe disease, neurasthenia, etc., and co-operates admirably with spinal treatment.

Having shown in the fifth chapter that the vital forces emanate from the spinal column, and having now shown the power of the pneumatic method to strengthen and develop any local function by producing hyperemia through atmospheric attraction, it is obvious that when

we treat the spinal column by Hæmospasia, we may rouse and renovate every debilitated organ in the body by the attraction of a slightly diminished pressure on the different portions of the spine, which draws the circulation to the spinal column, forces the blood more freely through the spinal cord, its nerves and the adjacent ganglia, and thus removes spinal disease and debility, whether from softening caused by a deficient blood supply or from any species of irritation.

It has long been known that cupping is of great value in spinal diseases, but it was not applied in the efficient manner of Hæmospasia, and it has been shown that Hæmospasia is a true vitalizer and not a mere derivative or cause of hyperæmic congestion like Hæmostasis, for it overcomes tumors and varicose veins, which would be greatly aggravated if Hæmospasia merely produced a blood congestion.

Inflammation is a hæmostatic condition, a blood congestion, from the exhaustion of the vital force in the parts, which maintains the circulation, hence Hæmospasia relieves it by diminishing pressure, assisting the flow and vitalizing the surrounding tissues, the healthy expansion of which assists the relaxed capillaries in the inflamed portion.

Thus does Hæmospasia give us not only the power of quenching local disease by flooding it with good blood, but the power of sending the vital forces where we please, and also withdrawing congestion whenever it is oppressive, as when we relieve the congestion of cholera and the congestion of the chill of intermittent fever. These congestions are deadly because they are venous congestions, and venous congestion is an attack on life by diminishing the supply of arterial blood, while lowering the vitality and softening the structure of the congested organs.

Hæmospasia, by relieving atmospheric pressure to the amount of one or two thousand pounds (for the entire atmospheric pressure on an adult has been computed at 30,000 pounds), greatly increases the facility of the circulation, and increases the rapidity of the pulse, making the blood more arterial and raising the temperature. Thus does it relieve pernicious congestion and exalt all the powers of life in proportion to its application, and as Sarcognomy shows where to apply it in a scientific manner, instead of relying on the empirical but fortunate methods heretofore in use, it would seem that PNEUMATIC SARCOGNOMY should stand in the very front rank of therapeutics, to exalt or depress the force and rate of the pulse.

Its most obvious suggestion is that we should adapt our cups to the whole or any portion of the spinal column and administer our

treatment with the pneumatic cup as we do with the hand or with the negative pole of an electric current for which I have given full directions. Upon many persons the hand is ineffective and electricity very limited in its power, but no human being can resist the pneumatic power.

What an enormous power we acquire by combining these three agencies to snatch the victim from the brink of the grave to which physicians and friends have resigned him! After a few dispersive passes (and if there be a venous or inflammatory congestion, a derivation to the lower or upper limbs), nervauric treatment may be applied on the part of the spine most involved, to concentrate the nervous forces, followed by a gentle and prolonged Hæmospasia at the same spot, to concentrate the circulation, and if necessary completed by our electric current charged with magnetic or medical virtues or with the nervaura of the operator. No such concentration of therapeutic power has heretofore been possible, because unknown.

Special Treatment. — A cup from three inches wide and six or eight inches long may be applied on the upper dorsal and three lower cervical vertebræ for the benefit of the thorax and head in all affections of those organs. It is one of the most effective tonics that we can use, and for simple invigoration may well be combined with the crural treatment which has been described. But there is no necessity for narrowing the cup, unless for a special spinal diagnosis by its effects. Cups six inches wide may be recommended; and a cup devised to cover the whole space from shoulder to shoulder, including as much of the shoulders as possible, would have so powerful a tonic and hygienic effect as to be justly considered a leading remedial agent.

This is what was lacking in Junod's derivation by the boot on the leg, which reduced congestion by derivation, and lowered the capacity for inflammatory and nervous affections, but did not at the same time actively rouse the hygienic energies or "*vis medicatrix naturæ*" which is developed at the shoulder.

In the treatment of fevers, the sub-human derivation should be used to overcome congestive febrile and inflammatory conditions, but it should be associated with antiphlogistic treatment on the side and the shoulder — on the shoulder to antagonize disease and on the body behind the humerus (region of Coolness) for a more perfect, cooling, soothing restorative and hypnotic influence than could be derived from the leg, for it better supports the energy of the brain.

The treatment of fevers, then, is very simple. Cups across the shoulders, cups behind the arm and sub-human derivation, effusion of

warm water or wet packs on the hypogastric region, and the medicine on which we should rely if there were no mechanical treatment (such, for example, as baptisia in typhoid fever, and quinine, salicin or syrup of phenic acid in other fevers); but the result of the latter will be found so satisfactory that many would become indifferent to the aid of medicine.

The treatment of Pneumatic Sarcognomy requires that the practitioner should make himself, as soon as possible, thoroughly familiar with the chart of locations on the body.

If already familiar with that, he will know that all affections of the abdominal organs are to be treated by invigorating the lower dorsal region, all pelvic disorders, and all affections of the lower limbs on the lumbo-sacral region and a few inches above and below it.

In short, there are not many diseases in which it is not important to go to the controlling center at the spine, which is often not only the controlling power but the seat of the disease. It must always be in a more or less morbid condition from its sympathy with the morbid organs.

That which Sarcognomy shows to be the true practice has already been largely verified by Dr. Newell. This skilful homeopathic physician in his extensive pneumatic practice has found himself compelled to treat the spine in all important cases.

The old-fashioned dry cupping and bloody cupping never expanded into a philosophic practice, because it was based on an incorrect idea of relief by derivation, either by bleeding after scarification or by a congestion of blood at the surface. Hæmospasia, on the contrary, produces not congestion, but an active hyperemic circulation, a true vitalizing process, which also brings the blood to the surface where it is oxygenated and where it throws off with increased facility its perspirable impurities through the skin.

This process also becomes an invaluable addition to our means of diagnosis, by showing the condition of the parts through the appearance of the blood brought to the surface. On healthy structures, Hæmospasia brings out a fine, healthy, florid color, but on all morbid parts the color is unhealthy. It may be pallid or dead-looking, or of various dark hues approaching absolute blackness. This tells where the disease is located, and often corrects the errors of medical diagnosis, as in the case of Mr. S., of Boston, treated by Dr. B., who was eminent as to diseases of the chest, for dangerous disease of the lungs, without giving him any relief. The pneumatic test showed that his lungs expanded freely, thoroughly and pleasantly, but that on the right side of the walls of his chest there was evidence of severe pleurisy having existed, leaving adhesions, which was the fact,

and the corrected diagnosis made the basis of a successful treatment.

In the case of Judge S., pronounced by seven eminent physicians a paralysis from cerebral embolism, the pneumatic test showed, instead of almost hopeless cerebral embolism, definite spinal lesions, which were cured by pneumatic treatment.

In the case of Mr. S,, the soundness of the lungs was shown by the pneumatic test, which will be explained when we consider the pneumatic treatment of the entire surface. The soundness of the lungs is shown by their free expansion under pressure, and the soundness of all parts of the body is shown by the healthy florid color developed under Hæmospasia. Guided by such a test, surgeons would not commit the mistake of cutting into the body to remove morbid organs, when they were in a sound condition, of which many horrid examples are recorded, the latest published being operations on two women for uterine tumors which proved to be nothing else but uterine expansions by pregnancy, one of five months, the other of seven months. Of course the operation was not completed, but both died in from one to three days, and it proved very unfortunate for the doctors who resided in Nebraska. (See *Medical Bulletin.*) The pneumatic diagnosis is mentioned by Junod as follows: "The color of the surface which has been subjected to Hæmospasia will serve as a diagnosis. Thus in the commencement of typhoid, the surface would assume a bluish tint, while on the approach of convalescence, the derivation reddens the tint, according to physiological laws. The same results may be observed in the treatment of other adynamic affections. If the surface subjected to Hæmospasia becomes firm, it may be supposed that the blood is fibrinous. Finally at the beginning of certain eruptive maladies, Hæmospasia can throw light on diagnosis by accelerating or quickening the exanthema on the part where it has been applied. The same means serve equally well in icterus." This treatment implies that his treatments were made chiefly on the limbs, but he seems to have no clear idea of the effects of different localities, or of the paramount importance of the spine which he appears to neglect. He describes his treatment simply as Hæmospasia or derivation, not stating whether upper or lower limbs or any other part was the locality, as if the whole treatment was nothing but derivation, the false idea which guided the old method of cupping. This contracted view renders his success still more marvellous, but it falls far short of the success obtained by Dr. Newell in paying more attention to the spine in all cases, and also in treating immediately over the morbid organs, as well as on the spine, thus accelerating the treatment and aiding the diagnosis. Junod's idea was derivation instead of bleeding, leeching and cupping, and he says by these

derivations the physician "can divert the blood from the general system for a sufficient space of time — *several days if necessary*." This is its great advantage over Hæmostasis by ligature which cannot be kept on many hours without some injury. But the leading benefit of Hæmospasia, *the increased vitality of the parts to which it is applied*, and the consequent revolution in the balance of functions he seems not to have understood, nor could he have appreciated its importance, if he had studied it without the knowledge of Sarcognomy.

If Hæmospasia had no other utility than its power to aid diagnosis, it should rank high among the contributions to practical therapeutics. It is not to be understood, however, that discoloration of the skin always implies merely disease of the subjacent structures. The morbid blood is attracted to the surfaces under pneumatic treatment, and diseases in the abdomen may be indicated by discoloration of the legs. Junot mentions this in his experience. For example, in a case of cholera accompanied by cholic and pain, derivation was continued for two hours, and he says: "The leg on which the boot was applied became nearly black." In a case of painful cholera reported by Dr. A. Catel, he says: "The color of the leg was peculiar, and quite different from that which usually follows Hæmospasia. It had the blueness peculiar to this malady, showing that even in convalescence the blood is slow to recover its normal color." The application was for 35 minutes. In a case of approaching small-pox he says: "The appearance of the limb acted upon showed by the characteristic discoloration the approach of an eruptive malady. On the following day the whole body was covered with small-pox; the patient rapidly recovered."

Junod, however, seems not to have appreciated the importance of the color of skin as an indication, and seldom mentions it in these reports. I would add that it does not require a powerful pneumatic derivation to bring a morbid color to the leg. One of my students, Mr. C., applied a cup on the leg in a case of peritonitis, and made an excellent illustration of the derivative power of cupping in relieving internal diseases. The cup was applied on the calf of the leg, not much over five minutes, and gave immediate relief to the pain of peritonitis, appearing to subdue the inflammation, which it attracted into the leg — making the leg as painful and tender as if suffering from severe rheumatic inflammation, so that it was more than a week before he could stand upon it, notwithstanding careful treatment. This was in accordance with a law of correlation, which may be presented here, as it has been overlooked in preceding chapters.

The law of correlation, which is similar to that between cerebral organs, operates between the limbs and the trunk. The upper and

lower limbs are parallel and analogous, in higher and lower spheres. The humerus or arm above the elbow correlates with the thorax, and the forearm (below the elbow) with the abdomen. In like manner, the thigh correlates with the thorax, and the leg with the abdominal region — the lower part of the leg and foot correlating with the pelvic region. Hence operations on the leg and foot, or the forearm and hand, affect the abdominal region, which operations on the upper arm and thigh affect the thorax. The cupping of the calf was therefore the proper thing in a case of peritonitis, as foot and leg baths are appropriate in fever.

We return to our special treatment. It may be stated broadly that wherever disease exists the tendency of Hæmospasia applied upon the morbid locality is to dispel the morbid blood, bring in a fresh wholesome circulation, promote absorption of improper depositions and restore all the conditions of health; for I have shown that every part of the body lives only by influx — the influx of arterial blood and nervaura or nervous energy, and hence it must be that the adequate influx of these two will restore any morbid organs to a sound condition. It is difficult to say how far any part must be advanced in destruction to resist the combined power of nervauric and pneumatic treatment. There is nothing in pathology more formidable than cancers, yet they have often been conquered by nervauric treatment alone, though I have forgotten to record the cases reported. I do not know that pneumatic treatment has ever been applied to them, but Dr. Newell has often applied it successfully in Bright's Disease.

It is therefore the physcian's duty to apply Hæmospasia as a restorative agent over all sorts of disease as often as required, and to apply it chiefly to the spinal column as a center and source of vital action. Its application over the abdominal surfaces must be restrained by the laws already fully stated, which lead us to prefer the posterior surfaces of the body. There is no objection to a moderate application of the nervauric hand, the negative pole or the pneumatic cup upon the abdomen to relieve morbid parts or assist enfeebled organs, if it be cautiously done; but there must not be much vital concentration upon the abdomen, and when it is treated, the spine should generally be treated at the same time. Even Junod obtained a glimpse of this, and he says: "This method is not so available in maladies of the abdomen. It has been therefore less frequently used, and there are not many clinical observations to report with regard to it. This might be foreseen as reaction is generally less efficacious when applied to the abdomen than when acting upon regions above the diaphragm. It is not astonishing therefore that Hæmospasia, the

most powerful of all, should bow to the general law." Nevertheless, when we understand all the functions, we may produce very important results by treating the abdomen in connection with the posterior surfaces.

The neck and basis of the brain behind the ear will occur to any one who understands locations as a seat of commanding power over the whole body. The neck in its relation to the brain at its basis is called the crural region, because it controls the lower limbs, and all the physiological and psychic energies with which they are associated. It offers us Vital Force at the basis of the cerebellum, and in the lower cervical region it gives control of the arms, while its three ganglia supply power to the heart. Hence it is that the most powerful stimulus we can give with electricity is upon the neck and basis of the cranium. Hæmospasia in this location, which is practicable with cups of the proper shape and size, will realize similar results to those which we produce by the hand and the battery.

The tonic region (or shoulders) being specially antagonistic to the relaxing abdominal region, or we may say, to the viscera generally, is the proper place for antagonizing visceral diseases and irritations. The entire shoulder — by its inferior, exterior and posterior surfaces — antagonizes the hypochondriac and abdominal surfaces, the liver, stomach and bowels. Extending under the shoulder into the axilla, we find antagonism to the pelvic organs and lower bowels, also antagonism to melancholy, insanity and hysteria.

Hence upon the shoulder region we tranquillize abdominal disorders, while we *invigorate* abdominal functions upon the lower dorsal spine and the abdominal surfaces. Mental disorders of every grade are relieved just under the arms, with the co-operation of the cephalic region or cervico-dorsal junction. Many insane patients might be relieved if this were acted on.

The arms maintain a direct (not antagonistic) sympathy with the parallel region of the body as they hang. The influence of the humerus invigorates the thorax, and that of the forearm the abdominal organs. Hence treatment below the elbow is valuable in abdominal affections, and above the elbow in affections of the lungs and heart. Diseases of the heart sometimes prove this by the pain in the shoulder extending to the elbow. In a case reported a week ago of death from heart-disease, the first thing noticed was severe pain in the arm. Junod has observed some of these things; he says: "The brachial derivation is very effective in affections of the heart and lungs;" and again, "The double application to the arms offers in certain cases resources that one might look for in vain from other means, especially when it is a question of chronic or acute affections

of the abdomen." "In uterine hemorrhages it is best to confine oneself to a double application: on the arms." That is certainly a good application; but it would be much better if extended to the shoulder and the surface of the chest below the arms, which is more tranquillizing. Of course, hemorrhages should also be treated by derivation to the lower limbs, which will greatly reduce the force of the circulation, and this he advises to the extent of "reducing the pulse to a thread." Though Junod did not understand the vital relation of the shoulder and the adjacent surfaces, he approximated the truth as near as he could in what he says of the arms — that Hæmospasia "is especially beneficial if applied to the arm when there are signs of miscarriage," and also that it should not be so applied when menstruation is approaching.

In amenorrhœa he appears to have used, instead of a simple spinal treatment, an apparatus including the whole pelvis, and also Hæmospasia to the lower limbs, with which he says he was very successful. Such cases may be well treated by an 8-inch cup on the lumbo-sacral region, aided if necessary by a cup from groin to groin, or on the groins alone. A gentle treatment on the lower limbs will assist. In dysmenorrhœa and menorrhagia, as well as hysteria, the sedative treatment below the arms is important, covering the regions of Sanity, Tranquillity and Chastity. In parturition, the lumbar and lower dorsal regions will give material aid.

The lower dorsal region should be invigorated by pneumatic treatment in *all abdominal affections*, and the lumbar region should be included in cases of constipation. The forearm yields assistance of great value in all dyspeptic affections. Of course, disorders which are congestive require the aid of Hæmospasic derivation, and the abdominal region is happily relieved on both upper and lower limbs. The former have less derivative power, but a more congenial influence.

In the less active conditions of disease, such as old tumors, deposits and dropsies, we should rely on spinal and local treatment, as the increased circulation produces great power of absorption. Junod and Newell have both recognized this, though the former has relied too much on general derivation and too little on spinal co-operation. Junod says: —

"In dropsies or collections of fluids it is most successful, as the vessels absorb the fluids in order to supply the vacuum caused by mechanical displacement of the blood in the system. This absorption is so rapid that in many cases it astonishes even the operator. Dropsies of the pleura and of the pericardium diminish in a few hours, and the intestinal and renal secretions are increased, sometimes as much as by the action of purgatives and diuretics. Where

there is œdema, absorption is facilitated in the same manner by a direct application on the parts affected. . . . When sanguineous congestions have resolved themselves into parts disposed to hemorrhage, Hæmospasia not only favors the reabsorption of the effused blood in the same way that it acts on the liquids arrested in the serous cavities, but it can diminish the general disturbance and swelling around the parts subjected to the hemorrhage." He says further: "I have been successful in combating ascites when it proceeded from impeded circulation caused by an engorged state of the abdominal viscera. I have dispersed with one application the congestions and swellings caused by neuralgia, tooth-ache or cold. Sometimes I have been able to arrest ptyalism, watering of the eyes, coryza and excessive alvine secretions."

It is obvious, therefore, that pneumatic treatment, which so powerfully promotes absorption, may excel all other means in cases of hemorrhage in the brain producing apoplexy and paralysis, in which it is important to control the cephalic circulation and to favor absorption. Certainly its brilliant results in apoplexy, paralysis, cerebral congestion and epilepsy sustain this view.

It is not necessary to write a volume of special directions: for I presume my reader to understand the principles and locations of Sarcognomy, and to realize that in Hæmospasia he has another and very powerful agent to operate on these locations.

I think he will find in lumbar and sacral or lumbo-spinal Hæmospasia, a powerful control over the sexual region and *all its diseases and infirmities.*

Hæmospasia is not limited to diseases, but applies with equal success to all defective development, whether in the sexual system, the muscular system, the nervous system, or the viscera. By increasing the circulation of organs and of their control in the spine, it insures their growth and normal development, and it does not seem absurd to hope that we may thus remodel defective constitutions *both physically and morally.*

A pneumatic jacket, which would attract the circulation into the upper part of the thorax, would not only produce important soothing, tonic and healthful effects; but, from the sympathy of the upper thoracic region with the brain and the ethical sentiments, it might be a powerful aid in elevating the character and reforming the vicious. But for the elevation of the human race we need a more decisive measure, which has been kept out of sight by a morbid moralism. The criminal population should not be allowed to propagate. Castration of criminals is the duty of society.

It is highly probable that the pneumatic treatment by rarefied air (or air-bath) would assist in this object; an ascent about three miles, which takes off half the atmospheric pressure, produces a great

reduction of animal force, leaving the higher faculties in full activity. Penal institutions ought therefore to be located in high mountain localities for the sake of this refining influence, and it would be worth while to try the rarefied-air chamber upon criminals of great animal force, as the condensed-air chamber is used to strengthen the animal forces. De Saussure stated that when less than twelve thousand feet high (11,273) on the Col du Géant, he and his companions were in a feverish condition with great thirst and a *horror of stimulants or food*, showing that the appetites were suppressed. At the height of 13,124 feet on Mount Blanc he could not take a dozen steps without feeling a degree of faintness that forced him to sit down. Fatigue at that elevation was "completely exhausting," compelling one to stop.

Thus elevated situations subdue the inferior, while they sustain the higher elements of humanity, and at a certain height the lungs are more developed and are protected from consumption. History shows the superiority of mountaineers, and cretinism is produced in the *valleys* of the Alps. A chamber to hold the patient in condensed or rarefied air must, according to the principles already stated, be valuable for stimulating the lower or the higher powers of the constitution.

If the head of the patient be exposed while his body is subjected to slightly diminished pressure, the effect must be the universal stimulation of the body and relief of any congestion of the head. On so large surface the change of pressure should be slight. The air that is breathed being of full pressure would be forced into the lungs and its absorption greatly accelerated — the expansion of the lungs being promoted and at the same time their condition tested, for the morbid part will reveal its location by the sensations of the patient. This measure however is of limited utility because depressing to the brain and lungs. Another method is better.

In a taller chamber, the whole body may be taken in and the outside air breathed from a tube. This has a more uniform effect and promotes the expansion of the lungs, the absorption of oxygen and its diffusion through the body, as well as invigoration of the circulation and relief of congestions and deposits in the chest.

Nothing has ever been discovered which has so vast and varied powers as pneumatic therapeia when guided by Sarcognomy. Even where none would suppose it beneficial in advance, as in direct application to tumors, varicose veins and œdema, its results are successful. The report of Junod's experiments in the military hospital at Chatham, England, published in the "Medical Times" and "Gazette" of Sept. 10, 1853, mentions a very remarkable case, — "an inter-

mittent cerebral neuralgia of several months' standing; the patient aged 60. This affection, after having resisted all known measures, *yielded to one application of Hæmospasia.*"

"In the treatment of chronic maladies," says Junod, "the application of Hæmospasia is generally for one hour and once a day." In acute cases there is no uniform rule, as the state of the disease and strength of the patient must determine. In grave cases, he says, it is necessary "to reduce the pulse to a thread and to keep it in that state for some hours." When serious inflammation is to be arrested, or when it is necessary to bring the patient near to fainting, stronger derivation must be made, and both lower limbs may be acted on at once.

A reduction of one or two pounds is sufficient in most cases, but in some as much as five or six may be taken off. A soft, relaxed temperament yields readily; but a dry, firm, tough constitution requires greater power and warmth or a warm bath to promote relaxation. This has already been explained in speaking of Hæmostasis.

Our final question is, By what apparatus shall we apply pneumatic treatment? a very important question, as one of the hindrances to its general adoption by physicians has been the expensiveness of any apparatus and the difficulty of finding any already manufactured. Physicians have been told that the cost would be $300. This, with the silence of the colleges and the general unfamiliarity with the mechanical and physiological principles involved, has nearly prevented any thought of pneumatic treatment by gentlemen who prefer their literary and professional dignity as prescribers to troublesome mechanical operations. But the expense has been very much over-rated.

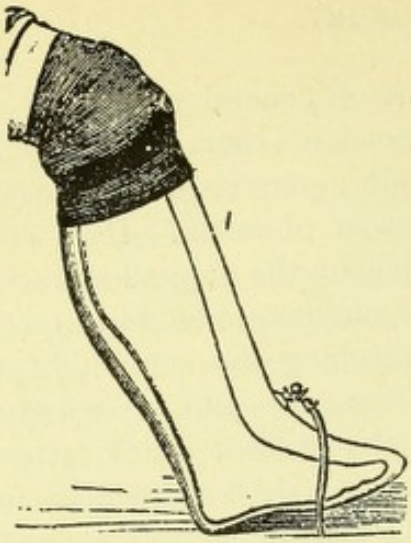
We need first an air-pump, costing anywhere from five to twenty-five dollars, and a gauge connected with it, to show the reduction of pressure. The five-dollar pump, though slower in operation, will be sufficient if we do not attempt to treat the whole body in a pneumatic chamber. Next we need three or four cups to apply to the whole spine, though we do not often need more than two. They may be four inches wide and eight inches long; or four of six inches or three of seven, eight and nine inches long. They may be two or three inches deep: the shallower they are, the quicker they may be exhausted. They must have a stop-cock or a valve by which they communicate with the tube from the pump, and when exhaustion is produced, the valve or the cock may shut off the communication and the cup be left sticking on the surface with its rarefied air, until we open the valve and admit the atmosphere. Thus we have as many cups as we wish, drawing at once. These cups will of course be applicable on any other surfaces they will fit. A pair of round cups

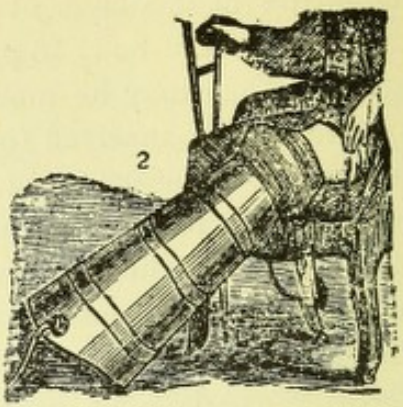
four or five inches in diameter would be of general utility. These cups should all have a layer of soft-gum elastic (India rubber) on the edges applied to the body to procure a more perfect fit and pleasant application. They may be made of glass or of metal. If of metal a glass plate may be inserted to give a view of the cupped surface.

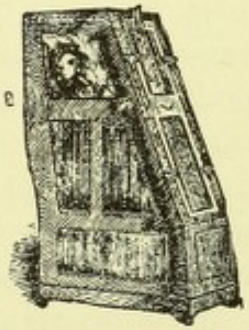
In addition to cups we need a pair of pneumatic boxes to receive the arms, a pair for the lower limbs reaching the summit of the thigh, and a pair for the legs reaching the knees. Junod used also a pelvic box, through which the lower limbs passed, which fastened around the body and the thighs, and a half-body box (hemi-somatic he called it) which took in the lower limbs and the body to above the hips. But there is no absolute necessity for these. I think a good outfit for practice might be obtained for $50 if a competent mechanic would undertake the manufacture. A very important part of the work is the construction of the rubber cups that fit the limbs tightly so as to exclude the air. I am at present devising an apparatus that may be furnished at a reasonable cost.

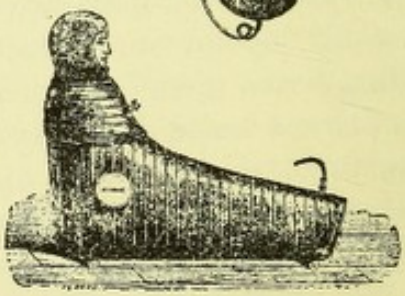
To promote the introduction of the pneumatic apparatus, I present the desirable forms, including those that have been used by Junod, on which the reader will observe the tubes connecting the pneumatic boxes or recipients, with the air-pumps, which he represents as small affairs, not more than six to ten inches long, and therefore not expensive. Junod coins names from the Greek, calling treatment on the leg *Scelic* Hæmospasia, and treatment including the thigh by a much longer word, *meroscelic* Hæmospasia. We have no need for these terms. For the spine he constructed a *series of small cups*, a very inadequate method, and hence he accomplished no great results in spinal treatment, and had a very incorrect idea of it. His whole conception of pneumatic treatment was essentially incorrect; he regarded it as mere *derivation*, whereas its value lies in increased *circulation* and development of functions. This requires for the spine large cups, three or four of which would cover its whole length.

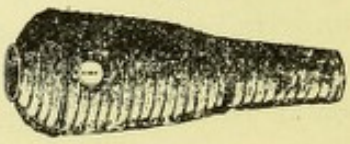
Fig. 1 shows the glass box or recipient for the leg. Fig. 2 shows a metallic leg-box more generally used by Dr. Newell and others. Metallic boxes (generally made of tin) sometimes have one or more glass plates inserted to make the limb visible under treatment. Fig. 3 shows the leg recipient in detached pieces, which may be telescoped together, making a convenient portable box, *P B*. Fig. 4 shows an arm-box of glass, and Fig. 5 a similar box of metal. Fig. 6 shows a glass box on the arm. Fig. 7 a metal box for the lower half of the body and limbs, very seldom used. Fig. 8 presents the pneumatic chamber or body-box as used by Dr. Newell, with the patient in it, and Fig. 9, Junod's application for the head and neck, which he calls



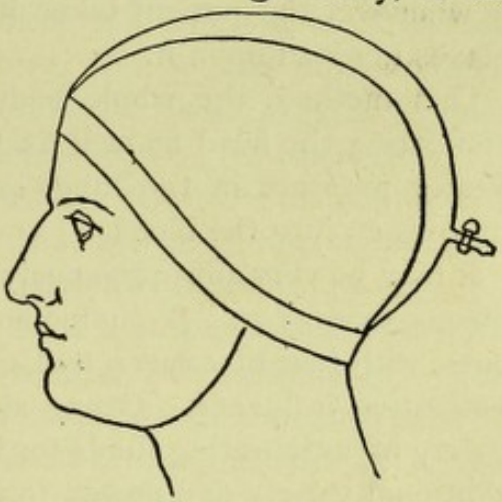








a perideric derivator (*perideric*, around the neck). He does not clearly explain its structure, but it obviously requires an India-rubber exterior and a wire frame-work underneath it. I have seen no report of its use; but properly constructed, it could be a powerful stimulant for the brain, which would be of great value for the insane and for impairment of the nervous system. I would however suggest a modification, leaving out the basilar region or neck, and simply inclosing the cranial surface as shown in this engraving. A sufficient amount of soft rubber, in a band at least half an inch thick, should be drawn around the head from forehead to the neck, and over this should be placed a cap of rubber or oiled silk, with a rubber band at its edge to clasp the soft mass in contact with the skin, the cap being sustained by a fabric of wire or elastic springs to prevent its pressure upon the head. This I believe would be sufficient generally, as all the surfaces concerned are normally convex; but if, owing to irregular surfaces, there is a lack of adaptation, the difficulty may be overcome by a leather strap buckled around it firmly, between which and the cap band any suitable wedges of wood or paper may be squeezed in to produce pressure at the proper spots. The exhausting tube connected with the air-pump may be attached at any convenient spot.



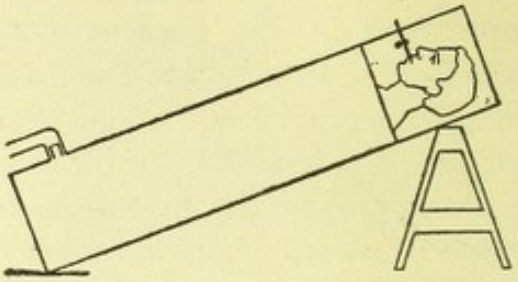
This cranial cap would co-operate well with cupping on the cephalic region of the spine and on the shoulders.

The somatic or whole-body treatment (*soma*, the body) by the pneumatic chamber is one of our most valuable resources, for it is a treatment of the entire person, addressed especially to the skin and therefore rousing by the law of sympathy the whole brain, and thus animating the whole constitution. In some respects it resembles the pneumatic treatment of the head, but it has this advantage that it includes the head and also covers the entire person, diffusing life everywhere. Hence I am sure that this will also be a measure of the highest rank of importance in lunatic asylums, while it has a vast range of power in the *treatment of all diseases*.

The box for body treatment used by Dr. Newell is shown in Fig. 8. Junod's box is shown in Fig. 10 with the patient in it and the head included by a cap. The figure below shows another box for the whole person, to be used when the patient is lying in bed, which may also have a cap adjustment. There is but little occasion to use a

box without including the head, and the attempt to include the head by means of a cap as proposed by Junod is evidently far inferior to the inclusion of the whole head in the box. These boxes separate at a joint in the upper part.

A cheap and simple arrangement may be made by constructing a simple oblong box, large enough to hold the entire person.



It should be pierced by a tube for respiration of the exterior air. This may be placed in any convenient slope for the comfort of the patient, and a glass plate fixed at the head for communication. The breathing-tube must be supplied with an interior cock to shut out the air, as without that the air would rush in whenever the patient takes his mouth from the tube to speak or relaxes his hold upon it.

This method, the whole body being included, has the merit of stimulating the head as well as the whole body, while the relatively greater pressure in the lungs promotes their expansion and forces the oxygen into the blood.

It may be very advantageously combined with the use of oxygen or nitrous oxide gas. A compound gas one half atmospheric or ten parts, with four of oxygen and one of nitrous oxide, has a delightful restorative influence. Ozone also is valuable in many cases, and a variety of evaporating fluids for inhalation in this manner would give additional variety and power to the treatment. A coffin-shaped box, having less spare room in it would require less activity in the pumps. The reclining position of the patient would be comfortable for treatment. A simple oblong box (avoiding the coffin shape, with a flat lid) would be equally appropriate, but would require a little more exhaustion of air. Its cheapness and great practical value should recommend it to all. It may be made large enough to accommodate the corpulent and, partly filled by mattress and quilts when occupied by smaller persons, to diminish the amount of air to be handled, and a block of wood might be placed at the foot when persons of short statue were treated. The box might also be converted into a warm bath, salt bath or bath of medical vapors, and thus a great variety of treatment combined.

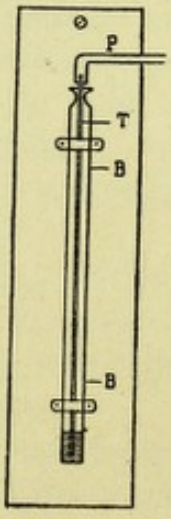
Treatment by reduced pressure in the pneumatic box for the body produces a feeling of general glow and tendency to perspiration. The nervous system is exhilarated and all uncomfortable conditions of the brain are removed or greatly diminished. The pressure of air in the lungs expands the chest and promotes the absorption of mor-

bid deposits, thereby giving great relief to pulmonary diseases. Thus it accomplishes an amount of general benefit to the patient which cannot be successfully imitated by any combination of medicines.

The entire pneumatic treatment, whether by the large receivers or the cups, requires to be guided by observation of the changes of pressure. It is possible, but seldom advisable, to reduce the atmospheric pressure one half, which is the reduction of pressure that occurs at the height of about three and a half miles, and reduces greatly the strength of those who endure it. The difference of pressure is astonishing when we first learn its amount. Being nearly fifteen pounds to the square inch, a well-developed man is generally estimated to live unber a pressure of thirty thousand pounds. Hence every reduction of pressure to the amount of one pound relieves him from a weight of two thousand pounds. In reducing pressure from one to five pounds, he is successively relieved of two, four, six, eight and ten thousand pounds of weight or pressure, and by this diminution of pressure the friction of the circulating blood is so greatly reduced as to make a hyperæmic circulation wherever we give this relief.

THE MANOMETER. — A pressure gauge (called a manometer) is necessary for scientific practice, and not knowing of any simple construction in use I have devised a manometer as follows :

Many plans may be devised ; but I think a perpendicular or a horizontal manometer will be most convenient and satisfactory. The perpendicular manometer I would construct like a barometric tube — sufficiently long to mark, by the ascent of the mercury in it, the diminution of pressure. If the pressure were entirely removed by a vacuum, the mercury would ascend about thirty inches, varying a little with the weather. If half the pressure were removed, it would ascend about fifteen inches, and this would be sufficient as a measure for pneumatic practice.



If the neck of the tube T be connected with the air-pump or cups by the rubber tube P and its lower end inserted in a bottle or elongated tube B B with mercury at the bottom, the mercury will ascend in the tube about two inches for every pound of pressure removed by the air-pump from the tube, and if graded in inches it would be a sufficient exponent of the reduction of pressure. A length of fifteen to eighteen inches would be sufficient for utility. The whole might be fastened to a wooden bar and inserted in a block of wood as a base to stand on, or might be suspended by a hole in the top of the bar.

On the horizontal plan we may have a manometer of great delicacy by the expansion of air in a long tube against a globule of

mercury as it is relieved from pressure. The horizontal tube may be three feet or longer, and capable of containing more than the bulb at its end. If of equal capacity, it would express a double expansion or loss of half the pressure ; safely fastened on a long bar of wood, it could be handled with facility. Each instrument would require to be graded upon trial, as the rate of expansion increases while the pressure is diminishing.

P. S.— I am not able as yet, to announce any manufacture of the pneumatic apparatus, but will make the announcement when a manufacturer shall be found whom I can recommend. The selfish policy of Dr. N. and others, in endeavoring to hold a monopoly of pneumatic treatment, to exaggerate its cost and conceal the manufacture of apparatus as something mysterious and difficult, has been an efficient cause in connection with the indolent illiberality of the colleges in depriving our country of this revolutionary benefaction. If those who wish the apparatus will send me their requests, it may help me to stimulate some manufacturer to supply the demand. My personal exertion and supervision will probably be necessary to the proper result.

CHAPTER XV.

PELVIC FUNCTIONS AND ORGANS.

Lumbo-sacral region — Importance of sexual development — Its effects — Injury by deficiency — Its influence for health and development — Conjugal relations — Centres of Love, spiritual and physical — Difference of the sexes — Sensibility of the womb — Pelvic disorders — Value of treatment on the back — Use of Helonias — Medical quackery — Inguinal region — Uterine region — Region of Sanity and Chastity — Sexual excitement, its control and its seat in the brain — Pathological cases illustrating its location — Influence of virility on Health and Vigor — Health as a co-operative — Centre of cerebellum as a reinforcement of Vitality — Treatment of the eyes — Anatomical references and correlative organs that sustain vision — Pathological relations to insanity and nausea — Morbid tendencies of the basilar and pelvic organs — The true nature of insanity — Its location in the brain and the body — How insanity is to be cured by treatment on the body and the brain — Counter-irritation on the back of the neck — The hypochondriac region concerned — Location of nausea on the body — The colon, cholic, nausea, vomiting and diarrhœa — Nausea of pregnancy — Influence of nausea — Method of its treatment.

NEXT to the region of Vital Force at the posterior summit of the thigh, we should consider the region of sexual life and development at the junction of the lumbar vertebræ with the pelvis in the portion called the sacrum — at the lower end of the backbone, to which the hips are united.

Sexual development is essential to the completeness of every being. Sexual and parental relations require a higher development of the faculties, virtues and energies than a non-sexual existence. They require Adhesiveness, Familiarity, Love and delicate sympathies between two persons — consequently a higher development of refinement and virtue, to make the relation attractive, pleasant and permanent. The parental relation which follows sexual love demands an additional development of the virtues and energies to meet its requirements properly. Hence the mammalia or animals that nourish their young by the maternal milk and give them prolonged care stand at the head of the animal kingdom.

It is, therefore, wisely ordered that sexual development in both man and woman, but more especially in woman, shall produce an increase of Vital Force, Adhesiveness, Love and Health according to pathognomic laws explained in my system of Anthropology.

Such being the case, sexual development is one of the most important incidents of human life. It develops in both sexes refinement, poetic thought, imagination, amiability, social attraction, desire to

please, health, animation and courage, which qualities produce a more perfect development of the person, a more vivid expression of the countenance, improvement in the voice, in the eye and in the manners.

A retarded or unhealthy development of puberty is a great injury to the female constitution, and throughout life woman's health and happiness depend greatly on the sexual system.

The sexual functions, therefore, cannot be neglected in nervauric treatment or in the conduct of life. The man or woman who has not attained full sexual development is a barren object, like a plant which has never bloomed, which has neither the beauty and fragrance of flowers, nor the benevolence of fruit, nor the possibility of a new life springing from its own. It is a meagre and unripe condition of humanity in which the sexual evolution is hindered, as we see illustrated in the difference between castrated and natural animals.

Sexual development is the last and highest stage of growth, which helps to change the rude boy into the attractive and dignified gentleman by perfecting the physical constitution and adding thereto the moral energy and warmth which fit him for society by attractive manners, and for the more important duties of life by an exaltation of the kindly emotions and the sense of duty and responsibility. It is true that *mere* sexuality as a controlling power becomes a vicious impulse in its abnormal action, but I speak of its normal action, according to the law by which the inferior sustain the higher faculties, as when Vital Force sustains Firmness and Heroism.

In repressing sexual evolution, whether by castration or by rigid authority and ascetic manners, we exert a degrading influence, impairing social harmony and happiness, and bringing life nearer to a basis of absolute selfishness. We are marring the Divine image in man, and assuming superiority to the Divine wisdom, which has associated sexual attraction and pleasure with the most admirable sentiments of sympathy and love, so closely that when the former are suppressed the latter are greatly injured, as the sexual portion of the cerebellum and spinal cord exerts a powerful influence upon the circulation, growth and development of the brain, especially of its superior portion which contributes most to its activity and growth. Animals under the influence of sexual passion show great energy and courage (especially deer and horses). Human beings show not only energy and courage, but *love*, tenderness, refinement, imagination, intelligence, gaiety, grace, liberality, ambition and sense of honor.

If the sexual element were expelled from the human constitution, society would lose its charm, and through selfishness and brutality would sink toward barbarism. Castration of animals produces a

signal degeneration, as shown in the comparative measurement by Leuret and Lassaigne of the brains of stallions and geldings. The cerebrum which in ten stallions averaged 433 grammes measured only 419 grammes as the average of 21 geldings. The moral and physical inferiority of the human eunuch are well known.

The superior development of the cerebrum and the superior evolution of the higher sentiments are due to the superior and central portion of the cerebellum and upper portion of the spinal cord (the seats of the sexual faculty); and as the development of the sexual faculty has so happy an influence, it follows that its normal cultivation must increase the effect, while its abnormal repression must tend to produce in some degree the effect of its destruction by castration. In the early portion of the century the vigorous ascetic superstition of Americans (under the *name* of Christianity) in New England had a very injurious effect upon the young in checking the normal development of their emotions and manners, impairing the health and beauty of both sexes — while the rebound of nature in those who escaped from the tyranny led them into the most destructive excesses.

The normal influence of sexuality is shown in the superior longevity and virtue of the married over the unmarried classes. This, however, does not lead to the inference that unlimited or intemperate sexual indulgence is harmless far from it. The general law of the brain and body is that the lower faculties, which are the radicals or physical supports of the higher, though indispensable to normal development, require to be strictly governed by the higher. But they cannot be repressed with impunity. As the repression of the muscular system impairs the force of character, the repression of the sexual system impairs the cerebral development and the nobler elements of character; for without the sexual system that vivid daily exchange of love which sustains both health and virtue would be much feebler.

Love is the world's saving, uplifting and perpetuating power, and in the sexual plan of humanity the Divine wisdom has secured its permanent presence and power. All attempts to amend or control the Divine plan arise from a lack of true religion,—a lack of the reverence, love and faith which appreciate the Divine plan of nature, allowing the entrance of censorious disgust where admiration of the Divine plan should exist. Actuated by this disgust, religious sects have assumed to crush human sexuality as a noxious weed, and compensate for its absence by extra cultivation of religious sentiments. The sincerity and fervor of their efforts cannot be denied; but they have fallen short of the physical, social and moral development to which they aspire, for they are thwarting a plan that is wiser than

human inventions. It is impossible that eunuchs or ascetic celibates should embody the highest type of humanity, either physically or morally, which is developed only through the predestined plan of love and parentage.

These considerations are not foreign to the subject of nervauric treatment, for it includes the sexual functions, and they are a very important part of the vital forces that maintain health and happiness. Love is correlative with health and perfection; it is attracted by physical and moral perfection in another, and it is the most powerful means of developing that perfection in its object. All the virtue of which man is capable is developed in the home in which he enjoys the sunshine of a woman's love; and all the happy energies, virtues and health of which a woman is capable are developed in the warmth of a devoted husband's love. This love, like all that constitutes humanity, has both its physical and its spiritual operation, and is beneficial and necessary alike in both. Perfection is not attainable without the full development, and the normal life of the fully developed, in a perfectly harmonious conjugal relation. Such relations as the world goes are seldom entirely harmonious, but a full development of the love nature in either party goes far to overcome all evils and secure contentment and health, where, otherwise, there might be gloom and misery. The refined and tender gallantry developed in man by sexual love is necessary to the happiness of woman, and the all-yielding, all-devoted sentiment which it develops in woman, not only gives to her husband the cheerful content which is necessary to perfect health, but develops in herself a happiness and a moral strength which sustain the physical constitution and resist the decay of age.

Love is the cause of the conjugal union, and such unions are happy whenever a sufficient amount of love exists in the parties, even though they are not exactly adapted to each other. The adaptation which makes the union perfectly happy depends upon the law of correlation, which is explained in my system of Anthropology, especially by Pathognomy. The simplest statement of the law is that each faculty of one must find its gratification in the other. Pathognomy enables us to determine the adaptation with great accuracy. The fanciful doctrines of Dr. W. Byrd Powell on this subject had some foundation in fact, but were highly exaggerated and distorted views of the human constitution, like most of his speculations. They were based upon crude and unscientific conceptions of human temperaments.

Sexual love has two controlling centres: the lumbo-sacral, which controls and sustains the sexual organs; and the mammæ, on the

front of the chest, which correspond to the organ of Love in the brain (just behind the coronal suture). The lower organ inspires the energy of passion, the upper produces admiration, sympathy, tenderness, devotion, service and fidelity, which in their highest degree might be called worship. The familiarity and the devotion are not exclusively sexual, but their chief manifestations are found between those of opposite sex. In parental love the difference in sex has less influence, though certainly not absent.

The superior love has an animating, inspiring influence over the whole moral nature; for love heightened to adoration is the essence of all religion, and the inferior faculty has a similar energizing influence on the whole physical constitution, and these two elements are so closely linked by the Creator as to make their joint development a necessity, for neither can attain its maximum power without the full development of both.

The larger development of the mammæ in women corresponds to their higher development in love and their consequent superior control by the moral nature, which is too obvious to require illustration. It is so very marked that the same exterior configuration of the head will produce better results in women than in men, because in woman there is a greater activity in the coronal region of the brain than in man. The same external form of skull which in a male would authorize me to pronounce him most probably a criminal would not authorize such an opinion if it were that of a female.

The sexual organs in a woman are very closely associated with the development of the mammæ, and the loving emotions of which they are the corporeal seat. Pregnancy brings on the development of the mammæ and the secretion of milk, and stimulation of the mammæ promotes the development of menstruation.

The sexual conformation is different in man, and it has a less intimate association with the higher love (which is explained by the laws of Pathognomy). Hence, in woman love is more spiritual and devoted — in man more physical, passionate and impulsive. But in each sex its intimate relation to Vital Force is apparent, since the sexual apparatus is in various degrees associated by its nerves with the whole lumbar and sacral regions upon which the lower limbs depend. Hence in the sexual derangements of women (and such derangements are pretty sure to follow unnatural repression or inharmonious life) great weakness of the limbs results, and sedentary habits (if not absolute repose) become necessary, while the entire nervous system is greatly deranged.

Irritation, inflammation or any form of active disease develops the constitutional influence of the locality in which it occurs, drawing

the vital forces in that direction and exhausting opposite regions. Pelvic diseases in women, affections of the womb, are accompanied by great impairment of the nervous system, producing a state of extreme excitability, impairment of memory, intellectual power, force of will and general brain power — thus increasing the tendency to melancholy and insanity. In this impaired state of the nervous system, slight causes produce great disturbances, and every function has more or less disturbance, producing apparent or *quasi* disease when there is really no organic affection, and the diseases often have sudden or magical cures.

The lower limbs being dependent on the same portion of the spinal cord always show weakness, and severe exertion of the lower limbs especially in walking up stairs is seldom well borne by women. The calorific function, which is so near the womb, is disturbed in various ways, but especially in irregularity. Flashes of alternate heat and coldness are common, especially at the menopause (cessation of menstruation). Respiration is also much affected, which is located next to Calorification, and pelvic excitability is shown in the young by laughter and screaming. Flashes of heat, difficulty of breathing and a frantic eagerness for fresh air are often seen.

These phenomena are explained according to Sarcognomy by the location of the womb in the body, and by reference to the head we find the uterine region located near Ardor, Respiration, Childishness, Idiocy, Insanity, Amativeness and the tendency to dissipation. The medical antagonist that quiets the uterine region is the Bromide of Ammonium, which is far superior to Bromide of Potassium.

The womb is such a centre of excitability, sympathy and sensitiveness that it is easily affected by a thousand physical and moral causes, and hence there are very few women who have positive sexual health. The great majority of females need treatment for some form of sexual derangement. Even many who think themselves in health (because they do not know what perfect health is) need this nervauric treatment, which produces far better results than the common drug practice. The old style of drug practice on women was so crude, so barbarous and so wretchedly meagre in its resources as to be responsible for a vast amount of human suffering, and its consequences transmitted to this generation.

In the majority of females, whether married or single, five or ten minutes of dispersive passes on the lumbo-sacral region will help to remove morbid conditions. Following this, the application of the hand to vitalize that region will have an admirable restorative effect. Nature has furnished us, in the HELONIAS dioica, a nearly specific tonic for this region, and the fluid extract if applied as an embroca-

tion on the skin of the lumbo-sacral region or used as a vaginal injection diluted with thirty or forty parts of tepid water will powerfully aid the restoration of health to the sexual apparatus of woman. It has, moreover, a fine influence on the brain, the stomach and the entire constitution, and ten or twenty drop doses by the stomach will produce its constitutional effects on all parts if used from one to four times daily. A popular knowledge and a general use of this remedy would have done more for the health of women than all that has been done by the medical profession, with the exception of the modern treatment of enlightened and liberal physicians.

In addition to invigorating the lumbo-sacral region, it is almost always quite necessary to use dispersive manipulations on the inguinal region or seat of sexual profluvia. This is especially necessary in cases of menorrhagia and dysmenorrhœa; and in males, in cases of spermatorrhœa or sexual weakness and relaxation. I know of no cases in which I have deemed the stimulation of the inguinal region necessary, except in amenorrhœa, in which it might be roused with the lumbo-sacral region, but not alone. The trouble from dysmenorrhœa at the catamenial periods is in general easily relieved by one or more doses of Hayden's Viburnum Compound, which should be kept on hand by women who need it.*

The uterine region above the pubes and below the umbilicus also needs stimulation only in cases of retarded development or amenorrhœa. In the majority of cases it needs dispersive treatment to procure nervous tranquillity — as it is the seat of that excitability which causes excessive emotional activity and at length appears as hysteria. Hysteria will be readily controlled by dispersive passes from the uterine region upward and backward, for it is a condition of Impressibility which readily responds to nervauric treatment. I do not deny however that the uterine region may receive an increment of health from the hand of a good healer, especially if the other hand be kept on the region of Health on the shoulder blade.

In tranquillizing the sexual system the best treatment is by dispersive passes over the uterine and inguinal regions upward and backward toward the armpits — then placing the hands just below the arms, on the side of the chest which covers the region of Mental Soundness and Tranquillity, which has been marked on the bust as the region of Sanity, — a region antagonistic to all abnormal excitement and nervous depression. The posterior part of this region running into Coolness may properly be called the region of Chastity, as it

* In the same group with Helonias may be placed Caulophyllum, Cimicifuga or Macrotys, Aletris farinosa, Mitchella repens, and Viburnum prunifolium (black haw),— all of which are valuable uterine tonics.

antagonizes sexual excitement. In cases of inordinate sexual desire with nymphomania or priapism, the region of Chastity should be excited, and dispersive means used at the uterine inguinal and lumbo-sacral regions. The dispersive treatment may always be reinforced by bathing or sponging with hot water. This sexual excitement has its cerebral seat at and below the occipital knob, in the superior and central portions of the cerebellum, at which location the sexual power may be reinforced by stimulation, as the sexual excitement may be subdued by the application of hot water or by the *prolonged* application of ice or of ether, which produces great coldness by its evaporated.

Sexual functions are certainly performed by the sexual organs, as forcible motion is effected by muscles, but in each case the controlling power is in the nervous system. The sexual parts depend upon their nerves, they upon the spinal cord, and the spinal cord upon the brain. Hence strong sexual excitement may be produced by a thought, but congested or hyperemic conditions of the sexual organs, even to priapism, may fail to excite any sexual passion, as its seat is really cephalic. On the other hand, the most morbid or destructive conditions of the sexual organs do not destroy the sexual inclinations. They have been manifested by women (according to Richerand and Gall) in whom the womb was entirely absent, and others in whom the womb and vagina were in the last stages of disease. Prof. Caillot relates one of these cases in which the womb was entirely absent.*

* M. Serres reports a case of apoplexy with priapism, in which the autopsy revealed inflammation of the central superior portion of the cerebellum, extending along the connecting fibres to the quadrigeminal bodies.

In another case (of a robust day-laborer) of apoplexy and satyriasis, with repeated emissions, the cerebrum was natural, but the *cerebellum* exhibited the most extreme inflammation in the central superior portion (looking as if it had been macerated in blood), and there was a small cavity in the right hemisphere.

In a third case of apoplexy (of a man forty-six years of age), accompanied by convulsive movements and satyriasis, with heat and swelling of the genitals, the cerebellum was large and its upper surface of a lively red, indicating inflammation, which extended along the process to the quadrigeminal bodies, which were also inflamed. This inflammation of the upper surface of the cerebellum was highly advanced along its superior central portion, in which cavities were just beginning to be formed.

In the fourth case, of a man named Gambier, apoplectic and unconscious, the limbs of the right side were entirely paralyzed, and this was explained in the autopsy by the effusion three inches long and one inch wide in the left corpus striatum. The limbs of the right side presented spasmodic contractions, and priapism continued to death. The latter was explained by the condition of the cerebellum, "the cerebellum, and especially the *superior vermicular process*, presented numerous little effusions of the size of a grain of hemp-seed."

These and other similar cases show as clearly as Pathology can that the central and superior portions of the cerebellum are concerned in the sexual functions, and the seat of inflammation in priapism or satyriasis. Inflammation and destruction of other portions of the cerebellum proceed most commonly to paralysis, but without sexual disturbance.

After I had located the sexual function by experiments below the occipital knob, it was very satisfactory to find that Pathology so clearly confirmed what I had discovered.

It is not merely in reference to the sexual organs themselves that we are interested in the lumbo-sacral region of virility, but in reference to general health and development also.

When we are stimulating the region of Health on the shoulders or on the head, we add a large amount of physical power by acting on the region of Vital Force on the thigh, or on the base of the brain behind the mastoid process — an addition which may be very important to those exhausted by disease or those naturally deficient in vital force.

In like manner the lumbo-sacral region may be used for the reinforcement of vitality as a controlling centre for the pelvis and lower limbs. Its influence is not like the region of Vital Force, concentred on the muscular and locomotive energies, but extends to the entire nervous system, like the developing influence of puberty, which in man is probably effected through the seminal secretion. Sexually speaking, its influence develops not voluptuousness, but virility. Therapeutically, it is reanimating alike to the nervous and muscular systems. Hence the combination of lumbo-sacral virility with the animating Health of the shoulders — either on the body or on the head — is often the very best thing that can be done to develop normal and useful life.

In rousing the various organs which need restoration, it is expedient to develop simultaneously the influence of Health which always makes a beneficial regulative influence. Thus in stimulating the gastric region with one hand, if the other be located on Health, the resulting effect on the stomach is very beneficial — the restorative influence of Health being sent to it as the soothing influence of morphine goes to the organ that is in pain.

When organs are languid or lifeless from weakness or exhaustion, the lumbo-sacral or cerebellic influence may be used to assist in their restoration. Thus in almost all cases of weakness of the eyes they may be invigorated or reanimated by placing the fingers of one hand above and below the occipital knob, on the centre of the cerebellum, and the other across the brows.

The precise central seat of the sense of vision is at the base of the front lobe just above the pupil of the eye, and if the fingers or thumb and fingers are applied to this spot it will stimulate the visual power, while the animation derived from the centre of the cerebellum

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In a case of extreme nymphomania in a woman, Josephine Dubourg, lasting through many years, and accompanied by insatiable excesses, the autopsy showed what might have been expected, — chronic induration of the central portion of the cerebellum, with some small incipient ulcerations; all around this central portion the cerebellum was inflamed and harder than natural, and the arteries of the cerebellum were unusually developed, as well as the arteries of the pelvis.

will greatly increase the effect. But as all the convolutions of the brows contribute to aid the sense of vision, it is well to extend the outer margin of the hand across the brows.

Perhaps the anatomical arrangement may help to illustrate this result. The sexual portion of the cerebellum is connected by continuous fibres called the *processus e cerebello* with the quadrigeminal bodies which are the origin of the optic nerve, and are called the optic lobes, and in applying the fingers as above described this whole tract from the cerebellum to the retinæ is included between them.

The visual power is also directly aided by the *correlative* organs of the perceptive convolutions, which occupy a space at the junction of Adhesiveness and Combativeness, which I have marked *Aggressiveness*. All anterior organs are dependent upon their correlative posterior organs for vigor, without which they are passive and deficient in strength. When Aggressiveness is excited, it produces a disposition to use the eyes, a curiosity to look and energy to stare, giving great power to impress and great vigor to the eyes. The region marked Aggressiveness on my bust is that portion of the brain called the *gyrus angularis*, which Ferrier claims to be the seat of vision as determined by experiments on birds. I cannot recognize it as the *seat of vision* in man, for I control vision by experiments on the brow and find it there psychometrically, in the only region of the brain which can be called intellectual; but that the support of the visual power requires the co-operation of its correlative in the occiput, and that without this support the visual power might fail, in accordance with a general law, I believe true. The power of the eye has its highest development in adhesive or attractive persons, and the courageous or combative men, who with these powers may either attract or control and overawe by a glance; and animals feel their power as well as human beings A feeble and timid character cannot reciprocate an earnest gaze. A strong character enforces his personality by a look. When Col. H. attempted a slight familiarity with Gen. Washington, he was abashed by a look.

To strengthen the eyes by the Aggressive region, we place the fingers on the occiput, on the level of the top of the ear about two inches behind it. The eyes may also be invigorated by the lower occipital region at the median line (the region of Arrogance) which coincides with Aggressiveness. Hence in treating the eyes from the occiput, the fingers should extend from the centre of the cerebellum above the occipital knob. This portion of the lower occiput called the *Cuneus* has been claimed by some pathologists as more truly the seat of vision than the gyrus angularis. Both are right. These are coinciding convolutions as explained by Pathognomy, and

both contribute to the strength of the eyes. The operator should give attention to both. But that they are the absolute and entire seat of vision was, I think, refuted by Goltz when he exhibited a dog in which these convolutions were destroyed, but the dog was not blind.

Let us now consider the pelvic region in its pathological relations, which are of great importance.

The lower margin of the pelvis has pathological tendencies as strongly marked as the hypochondriac regions — the hypochondriac influence being adverse to physical health and vigor, the pelvic to mental soundness and the strength of the nervous system. I must repeat again to avoid misconception that no organ is to be regarded as an unhealthy or injurious element of the constitution — all organs being constructed for necessary purposes. But such tendencies arise from negative causes — from the absence of the controlling forces which keep the organs in their proper sphere. The evil influence connected with any organ is that which arises from its uncontrolled predominance in the constitution, and they arise whenever its development is excessive or its antagonists are deficient.

The sexual organs, for example, produce in their excesses an utter prostration of the nervous system, of which we may see a terrible picture in medical writings upon masturbation, licentiousness, spermatorrhœa and sexual diseases. The mental and physical prostration that arise from such causes are due partly to the intense sensibility in the pelvis and hypochondria, partly to the character of the secretions, which are extremely exhaustive, and partly to the influence of the excretions of the rectum and bladder — partly, also, to the anti-cephalic character of the leg and foot in association with the sacral region of the spinal column.

Mental derangement, shown as monomania, idiocy, melancholy, peevishness, ill temper, childishness, hallucination, etc., depends primarily upon the failure of blood supply and circulation in the brain, which becomes enfeebled like all other organs under such failure, and becomes softened in structure so as to be incapable of any vigorous action. The tendency of all the basilar organs in predominance is in some degree insane, as they divert the circulation from the brain, and the majority of the human race are and ever have been very far from Sanity. It is but a few years since the most enlightened and advanced nation on earth was engaged in the horrible insanity of civil war, and this homicidal insanity still prevails among all the great nations.

While all the basilar forces in predominance are insane in various degrees, the maximum insane tendency is in front of the vertical

line between the front and back, where the sensitive excitability attains its maximum, and where we apply the term Insanity, because that is its effect in predominance. Stimulating the base of the temporo-sphenoidal region through this location under the jaw enables an impressible individual to realize the conditions of idiocy and insanity.

The excessive excitability and irritability of this region, operating on an enfeebled circulation, causes the most extreme irregularities in different parts of the brain, — congestion, hyperemia, anemia, etc., — destroying the mental balance and soundness of judgment, as when one is under the influence of extreme despondency, hallucination or rage. The slightest influences overpower the mental energy of any organ in this condition, or excite other organs to wild excess, and under the influence of unbalanced feelings the judgment loses all correctness.

The development from which this excitability comes is in the basis of the brain, at the entrance of the carotid arteries, and its external indication is under the jaw, where the carotids and jugulars pass, and where the superior cervical ganglion controls the anterior cerebral circulation. The corresponding location on the body is at the perineum between the thighs — a centre of depraving influences. Here we have the passional force and the turbulence of the thighs; the hostile passions of the buttocks; the stupefying influence of urine and fæces; the brutality of the leg and the mental torpor of the foot, which belong to the sacral region, with the passional excitability of the sexual organs, which is most conspicuous in hysteria — all of which are intensified in effect by conditions a little higher up — the prostrating melancholy of the upper inguinal region, and the intense nausea of the sacro-iliac junction. Under these combined influences we have every degree of mental prostration, — dementia, gloom, rage, idiocy and incapacity to entertain a rational conception.

The therapeutic consequences of this discovery are immense, and I earnestly entreat the superintendents of insane asylums to test the discovery in their treatment of the insane.

The therapeutic indication is, that when we can transfer the vital action from the base of the pelvis, or insane region, to the region of sanity on the thorax under the arms, or on the spine at the dorsal summit, INSANITY will be cured if the transfer is maintained, whether by nervauric, electric or pneumatic power.

The cure may be effected by restoring the pelvic organs to health — securing free and healthy action of the bowels by *soothing, alterative aperients;* restoring the womb chiefly by Helonias and Cimicifuga, and the urinary organs by Hydrangea and Epigea (to which

flowers of Lavender make a good addition), and sending vitality from the perineum to the region of Sanity by electric currents, the patient sitting, as on a saddle, on the positive sponge, or a metallic tube or rod, or a seat with a metallic centre-piece like a saddle, while negative sponges of large size are applied in the axilla, and occasionally on the summit of the dorsal region. Of course, no one would expect a chronic condition to be removed by a single application, or by anything less than a protracted treatment. In some few cases the effects would be prompt and marvellous — in the majority they would come slowly, at least as long as any organic derangement in the body remained.

In giving the nervauric treatment, passes should be made from the coccyx to the summit of the spine, and from the groin and inside of the thighs to the axilla. At the same time the Hygienic current should be used, for general health is needed to sustain the health of the brain. That is given by a current from the hypochondria to the centre of the shoulder-blade, or by passes in that direction. The positive pole should be applied at and behind the location marked Disease.

But may not Insanity be treated directly at the brain? Assuredly it may. Gentle currents may be passed from the under-jaw space, just in front of the carotids and jugulars, to two corresponding points — one on the sagittal suture, where the organ of Firmness is located; and the other parallel thereto, on the temporal arch in the middle of the parietal bone, its central point of ossification in the fetus and infant, marked on the bust as Sanity. To produce the best effect, the current should be passed through the hand of the operator.

The current may be from a battery of five to ten cells, applied on both sides of the head simultaneously by large sponge rheophores, or may be the primary current of the common portable battery moderated by large sponges or by passing through a strip of wet cloth long enough to supply the electric resistance and moderate the current. The magnetic current from my new electro-magnetic apparatus will produce the most satisfactory effects.

In nervauric treatment, passes from the region of Insanity to the crown of the head, and the application of the hand on the hygienic region would be proper. At the same time dispersive passes downward on the neck over the insane region along the jugular vein and similar downward passes on the back of the neck would be proper.

There is an insane region, externally located on the back of the neck, on the median line just below the basis of the cranium, on which dispersive passes are beneficial, and on which physicians have often found counter-irritation very useful in cerebral disorders.

Setons, blisters and irritating plasters on this location withdraw diseased conditions from the brain. The brain may be greatly soothed and benefited in morbid conditions by applying the positive sponge on the insane location at the lower angle of the jaw just in front of the lower part of the ear, or on the cervical location just mentioned (which affects its posterior half), the negative being applied at the shoulder or axilla, or in the hand, or, if there is an inflammatory condition, on the tibial surface of the leg. I have observed in a recent book by Dr. Thos. Dowse of Edinburgh, that he has discovered the advantage of applying the positive sponge on the location mentioned on the back of the neck.

The hypochondriac region co-operates efficiently with the lower pelvic in producing insane conditions. Hence it is highly important to rectify the conditions of the liver and stomach. The liver, especially, has much to do with mental depression and mania.

There is another pelvic influence or function which has been up to the present time almost as much of a mystery as Insanity. I refer to NAUSEA, — a condition which has never been located or explained. Sarcognomy shows its location at the sacro-iliac symphysis externally, which corresponds internally with the two ends of the colon, its origin from the ileum on the right side and its sigmoid flexure, connecting with the rectum on the left. The colon is the chief seat of nausea. Its disorders, called colics, are characterized chiefly by nausea and vomiting, as well as great mental depression, which is explained by the location of melancholy just in front of the ileum.

Lead cholic, which is accompanied by an irritated and contracted condition of the colon, develops the functions shown by Sarcognomy, melancholy and defecation, or desire to empty the bowels, being in front of the colon and nausea behind it. Hence the attack comes on with desponding wretchednesss and mental prostration, and a nausea which increases till it produces vomiting, while the desire to evacuate the bowels is tormenting. The nervous depression is so great as sometimes to result in paralysis of the upper or lower limbs or tongue, or of the forearm. The whole pelvic region has this paralyzing tendency, which is at its maximum in the anterior part of the insane region. The pain extends to the small of the back, and produces great restlessness. Vomiting gives only a momentary relief — the depression and weakness continue.

Bilious colic is also accompanied by nausea and vomiting. In both affections there is no elevation of temperature, but rather a coldness, as this irritation diverts from the calorific region, whereas the irritations of the ileum, which is in the calorific region, are accompanied by high fever. The existence of feverish heat and

thirst distinguishes inflammations of the small intestines from colic or affection of the colon. Diarrhœa and cholera, which are affections chiefly of the colon, are also accompanied by nausea and vomiting — sometimes quite protracted.

Nausea and vomiting arise from all severe affections of the colon, and may even be caused by harsh purgatives. Obstruction of the colon by irritating fecal matter or by strangulated hernia necessarily results in nausea and vomiting, and even an adjacent irritation may extend to the colon and produce nausea, as we observe in the early stages of pregnancy. The external location of Nausea, the sacro-iliac symphysis, corresponds to the internal iliac artery for the pelvic region, from which the pudic artery proceeds, supplying the reproductive organs, and establishing a vascular as well as nervous connection, and connection of proximity with the colon and rectum.

With this location of nausea, what are its physiological and therapeutic bearings? Physiologically, its influence is prostrating to the brain, but not to physical life. Emetics are depressing, but not dangerous.

Animal life of a gloomy character is promoted by nausea, and as everything in the sacral region has a relation to the lower limbs, especially the legs, nausea is a powerful means of subduing inflammatory and irritated conditions of the brain and chest, though not so comfortable as the tibial region of the leg. Hence it is that nausea is a familiar reliance in treating the lungs to take down inflammatory conditions and promote expectoration: — most expectorants are nauseants.

Therapeutically, we learn that nausea is to be treated on the lower part of the back by vigorous dispersive passes which may be assisted by upward dispersive passes in front from the same level — from the hypogastric and hypochondriac regions.

When this principle is understood, sea-sickness will be conquered by positive currents from the region of Nausea to Health — to the top of the shoulder and to the upper frontal surface of the chest as low as the nipple, if the immediate cause be removed.

As the philosophy of Insanity and Nausea has never before been known or suspected, I would request those who verify these principles in treatment to send me a report of their results.

The medical treatment of nausea should be by the sedative agents which diminish the sensibility of the lower abdominal region. This is the character of the bromides, which have been found most useful. The stimulation of the brain is also important, and belladonna has been made accessory. Champagne, coffee and tea are beneficial, and I have no doubt bromo-caffein would be serviceable.

In sea-sickness, or the nausea produced in a swing, we have the violent disturbance of the pelvic region by the momentum of the bowels continually changing as by a churning motion, which is of course diminished by lying flat on the back without elevating the head. It is this impact by a churning motion on the pelvic organs which I regard as the cause of sea-sickness.

As the cerebral location of Nausea is at the upper part of the cerebellum on each side of Virility, I would recommend its treatment by dispersive passes from this location, or by cooling applications such as a current of hot water, which leaves coolness as a consequence, or evaporating ether, which is very efficient, or pounded ice, which is certainly effective. I have not tried the local applications, but from my knowledge of the functions I am quite sure they will be effectual.

It may be that cooling applications to the back of the pelvis would be equally effective.

CHAPTER XVI.

ANIMAL MAGNETISM REVIEWED AND RECTIFIED.

Deleuze and Esdaile's Works.

Its marvellous phenomena —Opposition of materialism —Its unscientific character — Its neglect by the medical profession and cultivation by Egyptian priests — Sarcognomy — Deleuze's "Practical Instruction" — His erroneous theories corrected — His formula for magnetizing — The scientific method of producing the results — The localities on the head and the body — The evil effects of the unscientific method — Effects of the downward passes — Superiority of the upward — Nature of the magnetic seance — Blind empiricism — The improper method of removing pain or disease — Prevalence of contagion — Use of the breath and of water — Method of waking — Use of magnetized water — The baquet — Exalted powers of Somnambulism — Their source and philosophy — Explanation of the power of operators and best methods — Blind routine of magnetizers — Failure of the medical profession — Hartshorn's translation, its valuable testimony — Mechanical ideas of the medical profession — How to produce insensibility — Testimony of Cuvier, La Place and Georget — Corroboration by Psychometry — Treatment of Dr. Elliotson in London — Cloquet's operation in the magnetic state — Clairvoyance of Miss Brackett — Duty of the disciples of truth.

Value of Dr. Esdaile's "Mesmerism in India" — His numerous cases and liberal sentiments — Facility of the practice in India — A mesmeric magician — Testimony of the Catholic Church to the truth of animal magnetism and prohibition of its practice — Dr. Esdaile's first experiments on a criminal patient described — Great increase of impressibility — Therapeutic benefit of the trance — Description and explanation of the processes used in magnetizing — Of catalepsy and its removal — Intellectual and unintellectual methods — Demonstrations made upon a blind man. — Controlling his subjects in court — Practical value of Sarcognomy in India.

The nervauric treatment of disease, heretofore practised under the name of Animal Magnetism, which was so famously illustrated by Mesmer as to cause many to give it the name of Mesmerism, has achieved a vast amount of curative results in disease, and marvellous phenomena in the development of human intuition through Clairvoyance and Somniloquence. The vast amount of its benevolence and the *jealous hostility* of the great mass of the medical profession, notwithstanding its well attested cures and the numerous learned and brilliant volumes in which its claims have been set forth, are a sad illustration of the moral condition of the present century.

A great part of this opposition has been owing to the resolute, unyielding spirit of materialism which has dominated in all scientific circles; but a considerable part, also, has been due to the fact that Animal Magnetism, as taught and practised, has been purely empirical and has never attained the status of a science or been cultivated in a thoroughly scientific manner. But the medical profession has done almost nothing to remedy the defect and trace the phenomena

produced to their causes. They have shamefully neglected and discouraged therapeutic magnetism, because it could be practised by persons without a medical education, whom they regarded as ignoble rivals, and confined their attention to the easy and simple processes for producing somnambulism, carefully avoiding the production of clairvoyance and the wonderful cures that are effected with the operator's hand. Since the revival of hypnotism at Paris, their sole purpose appears to be, not to treat rational beings in a rational and benevolent manner, but to degrade their patients into the passive and credencive condition in which they are controlled by a word, — a process which I have never adopted because it destroys the scientific value of our experiments and degrades the subject, and certainly does not elevate the operator.

The marvellous effects produced on the human constitution were never traced to their source in the brain and the body; and as when the causes of the phenomena are unknown and unsought, science does not exist, the whole subject becomes puzzling, embarrassing and repellent to minds accustomed to the mastery of positive science.

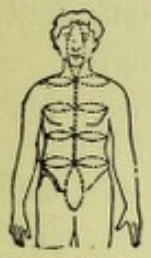
If the *rationale* of clairvoyance and somniloquence had been discovered, if the philosophy of magnetic cures had been made clear, and if the marvellous powers exercised over the magnetic subject had been used to unfold the mysteries and localities of the vital forces, so as to give command of all vital functions, — philosophic thinkers would have found in the science an irresistible attraction.

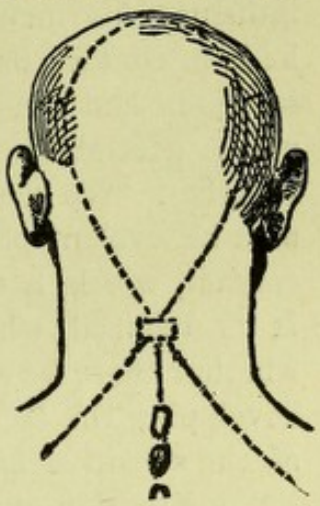
To me it appears really a marvellous degree of thoughtlessness or stupidity that the cultivators of Animal Magnetism, having under their manipulation the most sensitive individuals in society, should never, even by accident, have found any difference in the vital functional relations of the different parts of the body. It is also marvellous that electro-therapeutists should have been equally dull. It is apparent in both cases that the average cultivator of science is entirely preoccupied with what he has been taught, and very rarely disposed to look for any new truth or even conscious of the vast extent of undeveloped science that demands our attention.

Even the ancient Egyptians, encumbered as they were by superstition, were more observant in this matter than the moderns encumbered by college dogmas.

A memorial tablet of stone (as stated by Franz Lambert) in the National Library at Paris tells in beautiful hieroglyphics the story of the healing of Bentrosch, the sister-in-law of Ramses XII, an Egyptian king. Being taken very ill in Buchtan, and the local physicians unable to relieve her, the king ordered his physicians to

send a man who was "master of his will and master of his fingers," a very good direction. Thotemhebi was sent, and when he arrived, pronounced Bentrosch obsessed, and endeavored to conquer the obsession but failed. After eleven years more without relief, a request was sent to Egypt for a god, and the king went to the temple of the deity, "Chonso-nofer-hotef," asking him to give his agent his blessing or power. This was done by the blessing passes in the following form, four times. The physician, thus prepared, went to Buchtan and healed the possessed Bentrosch by the blessing passes in the following form, called SA. The pass is made over the backhead towards the shoulders, as shown by the lines, repeatedly with both hands.





In a work by Lepsius, Vol. III, it is shown that the female deity Muth says to Ramses III — "I hold out both of my arms to make the SA passes behind your head." The nodes indicated on the head and neck indicate no doubt the places where the hands are to rest on the spot with some pressure.

Great importance seems to have been attached to the spot on the neck. The Hebrew Cabbalists taught that a small bone of the neck (one of the cervical vertebræ) which they called *Luz* was imperishable; and this is no doubt identical with the *Uls* of the Egyptians, which lies where the spinal column makes a turn from the backhead towards the shoulders. The two words are considered synonymous. The language of statement implies that the intention of the SA pass was to wake the interior life.

As there is a slight backward curvature where cervical and dorsal vertebræ join, this shows the location of Luz or Uls, and proves that the Egyptians had learned the commanding importance of that location as a head centre of the Vital Forces, which had not been suspected in modern times until the revelation of Sarcognomy which demonstrates its supreme power and gives the anatomical and psychic reasons.

SARCOGNOMY is the result of the scientific method applied to this investigation, and enables us to review the operations and correct the errors of the cultivators of Animal Magnetism. To perform this task briefly and bring the chaos of benevolent empiricism under the jurisdiction of science, let us look at the instructions of Deleuze, the learned and benevolent expounder of Animal Magnetism.

His volume of "Practical Instruction" opens with the statements of principles which he pronounces essential and invariable, viz.: that

man exercises a salutary influence over his fellow-beings by his will, which is called *magnetism;* that the first condition of the operation "is to exercise the will;" that this will operates through something called the magnetic fluid; and that "the direct action of magnetism ceases when the magnetizer ceases to will;" and that "magnetism generally exercises no influence upon persons in health."

This is but a collection of errors. The vital emanation or nervaura, which has been called Animal Magnetism, proceeds continually and unconsciously from every human being and tends to impress his influence, his mental and physical characteristics on all with whom he is in contact or approximation. We see this in the diffusion of smallpox and virulent fevers, in the contagious influences that rule public assemblies, and in the assimilation of those who associate together. We see it especially in the power of the healing presence of a benevolent physician, who cures without medicine and without contact, which has been the method of some of our best healers. It is realized whenever the hands are placed upon the patient, whether there be any purpose or not; and in all my experiments for developing the faculties, passions and vital forces in which the nature of the sensitive is for the time being revolutionized or subjected to the domination of various passions, such as pride, religion, sympathy, fear or anger, I have always carefully avoided any exercise of will or any desire to influence the results, and have instructed my pupils accordingly. The influence of the hand is sufficient apart from will. And yet a determined influence of the will must influence a passive sensitive, and therefore may add materially to the result. But that the nervaura exerts no influence on persons in health, is an astonishing statement to come from so intelligent and respectable a source. All mankind are susceptible in various degrees to the influence of the nervaura and the will; and I have often found a higher susceptibility during health than in disease. Some diseases enhance and others diminish the susceptibility.

Deleuze next describes his process of magnetizing, which is little more than the general or extensive application of the operator's hands to the person of the subject, by gentle touches and passes, while the patient sits in a passive condition with nothing to attract his attention but these manipulations, while he rests in the state of self-surrender which is enjoined. His first direction is quite trivial and unimportant: "Take his thumbs between your two fingers so that the inside of your thumbs may touch the inside of his. Remain in this situation from two to five minutes, or until you perceive there is an equal degree of heat between your thumbs and his." This is a puerile formula. The impression to be made by the operator's hands

can be much better made by applying his whole hands to the inner surface of the patient's, the tendency of which would be to establish sympathetic connection and influence. But the whole magnetizing procedure, thumbing, passes, hand-shaking, etc., is a crude, partial, unscientific method. The application of the operator's hands upon any portion of the anterior surface of the chest would have a better effect. Still better would be the application of the hands on the top of the head, anteriorly and laterally, which would produce an amiable and submissive feeling. If magnetism were merely, as Deleuze says, producing an effect by the will, the whole process that he recommends would be useless and absurd. Operators who rely on the will alone do not use it.

The whole object of the magnetic seance of half an hour or an hour is to produce the passive, sensitive condition which yields to all influences, and may gradually pass into a state of somniloquent trance, and it is a practicable, though tedious way of effecting it. Deleuze recommends the first seance to be for an hour, and if no effect is experienced, to continue treatment for a month. But the object desired may be attained frequently in a few minutes. It is the evolution of functions which belong to the region behind the eyes, where the frontal and middle lobes of the brain come together, —the regions of Sensibility, Impressibility and Somnolence. If the patient is sufficiently sensitive to be materially affected by the passes of the operator, he can certainly be affected by the direct application of the hands to the organs to be roused. The application of the fingers upon the temples, an inch behind the brow, will produce in a few minutes the same effects which the magnetizer seeks by the tedious formula of magnetic passes which Deleuze minutely describes. If the fingers are accurately placed upon Somnolence, the effect is revealed in a few minutes by the winking of the eyes and disposition to close them. A thorough sensitive will in a few minutes be brought into the somniloquent trance—others may only realize the soothing effect. If the fingers are placed a little further back, the effect will be a development of Sensibility and Impressibility which will render the subject more amenable to local treatment and to the action of delicate remedies. It will also bring him sympathetically under the influence of the operator's constitution or will if need be, as well as the tedious processes of Deleuze. Without touching the head, however, the whole results of the magnetic seance may be developed by placing the hand at the lower end of the sternum, extending down on the median line from four to five inches. The entire space between the umbilicus and sternum is a region of soothing, sympathetic, somnolent influences which the magnetizer

endeavors to develop, not by operating directly upon their seat, but by applying a general treatment. He who would attempt to develop a particular note in the piano by pounding the framework instead of touching the proper key would commit a similar error.

In the Deleuze process the hands are moved to the level of the head, placed on the shoulders about a minute and drawn lightly down to the tips of the fingers, "touching lightly;" then placed on the head a moment, brought down before the face at a distance of one or two inches, as far as the pit of the stomach; then slowly down to the ends of the feet. Then repeat without touching the head, but "shaking the fingers" at the end of each pass, and end by making transverse passes at a distance of three or four inches before the face and before the chest. Passes may also be made from the shoulders down the back, hips and thighs.

Much of these directions is arbitrary and fanciful. Passes along the median line down to the epigastrium are, however, appropriate to the purpose, and in the most sensitive may be effective, but not so prompt and efficient as the direct application of the hands to the epigastrium. In these passes mistakes are frequently made by applying an influence to the hypochondria. Deleuze himself says: "Sometimes the patient experiences pain at the stomach and nausea which is even followed by vomiting; at other times he experiences cholic pains, and sometimes desires the sitting suspended because he feels a species of irritation," — all of which shows the injurious effects of downward passes to the hypochondria and the abdomen generally, prompted by the mistaken dogma that the downward are the only magnetic passes. It is very remarkable that this was never discovered, and that neither electricians nor magnetizers had any conception of the pathological tendency of the hypochondria, although they often brought out its pathological influence; and electricians, as Althaus and others, have been compelled to desist from operations in the hypochondriac region, yet there was never enough of the spirit of investigation to discover the local cause of the injurious results produced,— the fact that the hypochondria are the regions of morbid tendencies.

Deleuze says that the patient must "not be in the least alarmed at any crisis or transient indisposition." Magnetism "*frequently brings on very sharp pains.* These pains prove that it acts powerfully; they are necessary to subdue the disease. If, then, you experience sufferings, you will have the fortitude to bear them without speaking of them to any one. You will not even ask your magnetizer to calm them. If you have not beforehand taken the firm resolution of resisting the first pains that it causes you to feel; if

your magnetizer has not confidence and force of character enough not to be alarmed about them, — it would be better for you not to commence. I acknowledge that magnetism has been known to excite a nervous irritation and an uneasiness which continue after the sittings without being followed by any crisis."

These frank admissions are just what we should expect from his adhering to the dogma that *downward passes* alone are beneficial (which is entirely false), and prosecuting blindly his regular routine without inquiring or wishing to inquire into the causes of the results. The notion that some injury to the patient is a necessary part of the curative process is parallel to a similar notion that has tacitly pervaded the old harsh and heroic practice of medicine. *It is utterly false.* A beneficent agency never does harm, except by *the blind ignorance of those who apply it.*

So far from downward passes being the only beneficial or magnetic ones, their *general tendency* is decidedly injurious when they carry the vital forces from the thorax to the abdomen ; pre-eminently injurious when they carry the influence no lower than the hypochondria ; relaxing, debilitating, depressing and nervous when they extend to the hypogastric region, where we find nervousness and melancholy, from which evil effects the magnetizer escapes only by continuing the passes down the limbs, producing physical vigor at the thighs and mental dulness or quietude upon the legs and feet. Onimus and Legros, in the practice of electro-therapeutics, acted upon a similar notion current among electricians, and in treating a case of chorea they passed the electric current from the hands to the feet, expecting to cure disease in the lower limbs by the descending current. They found to their surprise, however, that the arms in four seances were cured by the ascending current they received. They continued the downward current from the spine for six seances without any benefit to the lower limbs, and then tried an ascending current to the spine, which completed the cure in two seances.

The result of the long passes is to diminish mentality and all the energetic impulses and emotions which sustain health, and to promote a state of purely animal life, subject, however, to the danger of producing very morbid, irritating, sickening and depressing influences, unless the impression be thoroughly removed from the abdomen to the limbs.

Upon the front of the body passes from the abdomen *up* the thorax are as beneficial as the reverse are injurious. Let any one who wishes to realize this try a number of individuals in succession with brisk and energetic passes, with a light friction on the clothing (or still lighter if on the skin), upward from the hypochondria to

the shoulders or neck, or from the hypogastric region to the shoulders, either above or below the arms. It will be found invariably that these passes and frictions are refreshing, energizing and delightful. They disperse all morbid, debilitating conditions, rouse the pleasant emotions and promote calmness and health.

The passes down to the feet recommended by Deleuze are appropriate for reducing the activity of the brain, and are thus favorable to sleep.

Deleuze says: "It is proper, in finishing, to make several passes along the legs, from the knees to the end of the feet. These passes free the head." This is a correct observation, although the author had no conception of the reason involved. Dismissing the formula of passes, the application of the hands on the top of the feet is the best way of freeing the head, and the application on the front of the legs relieves both head and chest, as Sarcognomy explains.

"The descending passes are magnetic. The ascending movements are not," says Deleuze. This is incorrect, all passes are about equally efficient at similar distances. The terminus of the pass determines its effect. Prolonged passes terminating at the hypochondria are quite injurious. Any function of life may be developed by passes *towards* its locality, whether upward or downward. Somnolence may be promoted by passes to the epigastrium, whether downward, upward or lateral. The Sarcognomist makes passes from the function to be checked toward the function to be developed. The electric current in like manner develops the function of the part to which it is sent.

Deleuze commends magnetizing by the long pass from the head to the feet without touching, and also with gentle friction, as beneficial, which is true in many cases; but in general he prefers to keep the hand one or two inches from the body and sometimes at a distance of several feet.

This is not idle mummery. An influence may be exerted upon sensitives without contact, and, moreover, passes without contact vividly excite the imagination and sensitiveness of the patient, and thus add to the effect. Neither are such passes inefficient with those in health. It is merely a question of impressibility and imagination.

The true effect of the magnetic seance is the cultivation of sensibility by a passive condition with the attention fixed upon the faint impression from the operator's hands; secondly, the surrender of soul and body to the influence of the active operator in close proximity, as an auditor surrenders to the influence of the speaker; thirdly, the promotion of Somnolence by fixed attention to the oper-

ator and his monotonous passes. The latter result, however, may be more simply attained by fixed attention to any other object held near the eyes, an expedient sometimes employed in public exhibitions for selecting impressible subjects, or by a steady gaze into the patient's eyes. Moreover, Somnolence is strongly promoted by the nervauric emanations in proportion as they are recognized and felt by the subject. The whole process therefore is designed to produce indirectly what we produce directly when we stimulate the region in the temples or on the epigastrium ; and the practicability of developing the latter by a galvanic current renders such a process more intelligible and satisfactory to a scientific mind.

But Deleuze was ignorantly empirical. He gives his directions, predicts the results and then says: "It is *useless to search out the causes* of these facts ; it is sufficient that experience has established them ;" and this is a leading reason why scientists have manifested an aversion to the subject of Animal Magnetism.

The term Animal Magnetism is perhaps allowable, though somewhat fanciful. Magnetism is an attractive force inherent in minerals. The human nervaura is not simply an attractive influence. It has every conceivable variety of influences, — attractive, repulsive, wholesome, injurious, intellectual, stupid, elevating, debasing, exciting, calming, — and Sarcognomy enables us to comprehend all these various influences and their local sources so as to evoke them when needed and to use them for good purposes.

The attractive influences which have some analogy to Magnetism belong to the upper portion of the back and to the upper portion of the occiput. An operator in whom the occipital organs are large has a commanding force and is said to have a strong magnetism, meaning thereby attraction and controlling power.

In his directions for the treatment of disease, Deleuze correctly states that pains are carried off by passes in the direction in which they are moved ; but some of his advice is not quite judicious. He directs the application of the hand for several minutes upon the seat of pain or disease, followed by a descending pass toward the extremities. This may be well for the patient, but not for the operator. In placing his hands on the morbid part, the operator is making an exchange of vital influences, and if sensitive himself he receives the entire morbid emanation into his hands, and in a few such operations receives a very sensible injurious influence. We do not need to refer to very contagious diseases to understand this matter,— all conditions, whether pathological or physiological, are contagious to the sensitive, and this perpetual contagion is the chief objection to the nervauric practice. Hence I have always warned my pupils with

great emphasis to protect themselves: not to remain passively in contact with any form of disease, but to maintain as active a condition as possible, — not to rest in contact with morbid parts, but first energetically remove the morbid condition and aura by dispersive passes, carrying it out of the body before applying the sanative influence of the healthy hand, — not applying it then in a very passive manner, but holding the muscles firm and making as much active manipulation as possible.

Deleuze recommends another process which is beneficial; but instead of applying it at first, as he suggests, it should be applied after dispersive passes or frictions. He says: "Place a piece of linen several times folded, or a fragment of woollen or cotton cloth, upon the suffering part, apply the mouth above it, and breathe through it." This method applies a very general and wholesome influence from the interior of the chest and is not sufficiently appreciated.

Deleuze also mentions a case in which water was used for carrying off disease: M. N. filled a glass with water and covered it with a linen cloth to prevent spilling, then applied it to the back of the head of a patient, making passes from the head to the tumbler, giving decided relief. It is very true that water may carry off pathological influences, as all hydropathists know, and this is further illustrated in the electric bath. Water flowing upon a diseased part becomes charged with a morbid aura and capable of conveying it.

Deleuze directs the patient whose eyes are closed to be roused by "passes transversely across the eyes." It is far more effective to stand behind the patient and make passes, either from the outer angle of the eyes or from the inner angles, backward and upward towards the region of Firmness and Energy.

Deleuze relates a case of hysteria with convulsions occurring in his practice, which alarmed and astonished him, but speedily passed off. If he had known the proper hypogastric treatment it would have been very easily controlled.

The instructions of Deleuze in reference to the use of magnetized water for healing need not be discussed farther than to say that psychometry fully establishes the potential influence over sensitives of any and every emanation from a human being and the objects to which that emanation may be attached. He recommends the use of magnetized objects to apply upon the seat of pain, such as tissues of cotton or silk, and plates of glass, gold or steel. Modern magnetizers in the United States are using paper with success for sending out magnetic influences to patients. Of course, the success of such means depends on a high degree of susceptibility in the patient and a very potent vitality in the operator.

In the magnetic *baquet*, composed of bottles of magnetized water, communicating by wires with a central conductor as if they were Leyden jars charged with electricity, — Deleuze passes from the sphere of tangible science into that of imagination and ignorance; for imagination skilfully impressed would produce far greater results than his *baquet*, on the model of Mesmer, the unscientific enthusiast.

In the development of Somniloquence, no matter by what process or by the course of nature, there is a great exaltation of the interior or intuitive faculties, and Deleuze speaks very correctly of the phenomena of somniloquence or somnambulism. He says: "In the state of somnambulism the moral sensibility is undeniably much more lively." The cause of this is developed by Sarcognomy. "There is in most somnambulists a development of sensibility of which we can have no conception. They are susceptible of receiving influence from everything that surrounds them, and principally from living beings. They are not only affected by physical emanations or the effluvia of living bodies, but also to a degree much more surprising by the thoughts and sentiments of those who surround them. If you are alone with a somnambulist and any one is permitted to enter, the somnambulist generally perceives it. Sometimes the person who enters is indifferent to him; at other times he feels for him either a sympathy or an antipathy." If the stranger is incredulous and suspects the sincerity of the somnambulist, or makes a jest of what he sees, the somnambulist is troubled and loses his lucidity. "If many witnesses surround and are occupied about him, the fluid of each of them acts upon his organization."

This sensitive condition is merely an active state of the interior faculties, which exists normally in those who have a large development of the lateral and interior regions of the front lobe, and who by their psychometric perceptions are continually in rapport with those around them, or those at a distance to whom their minds are directed.

The development of Intuition, the divinely intelligent element in man, under the name of Psychometry, will guide mankind hereafter into more profound science and philosophy than has ever before been conceived, — carrying us into all the mysteries of physiology, pneumatology, paleontology, astronomy, geology and antiquity. This interior faculty has been apparent in the somnambulism of magnetizers, but has not been guided and used for the results of which it is capable.

Deleuze describes the somnambulistic phenomena, which sometimes appear as follows: "When the somnambulist has reached this degree of exaltation, his manner of speaking is almost always dif-

ferent from that which he has in his ordinary state. His diction is pure and simple, elegant and precise; his manner, unimpatient; everything announces in him a state of tranquillity, a distinct view of that of which he speaks, and an entire conviction of its reality. You perceive in his discourse not the least of what is called excitement or enthusiasm. In this new situation the mind is filled with religious ideas with which perhaps it was never before occupied. . . . . This life appears to him only a journey, during which we ought to collect what is necessary for us in our everlasting mansions . . . Sometimes the prodigious difference he perceives between his new manner of viewing objects and that which he had in his ordinary state, the new lights which shine for him, the new faculties with which he finds himself endowed, the immensity of the horizon which is spread before his eyes — persuade him that he is inspired."

In that mental condition supernal intelligences do communicate and influence the mind, or may even control the sensitive and make him their mouthpiece. When we know that these exalted powers may be cultivated by stimulating the organs behind the eyes and behind the root of the nose, with their corresponding locations at the lower end of the sternum and the epigastrium, we have added greatly to our power of seeking truth and wisdom, and advancing education. The boy, the girl, or the uneducated laborer, may become by the development of their interior faculties, teachers to those most advanced in education, as patients have often been enabled to instruct their physicians in diagnoses, prognoses and remedies.

Of marvellous phenomena Deleuze is but a modest narrator, without the slightest effort at investigation. He says: "There exists with some individuals a magnetic power, truly prodigious, of which I do not pretend to know the cause. Many magnetizers induce somnambulism with very great facility and do not hope for success except from this crisis, while others can scarcely effect it, yet do not do the less good. Some of them act only by the will, without any apparent magnetic process."

The explanation of this, which will be given more fully in my Anthropology, is found in the occipital energy belonging to the region on the head just back of Combativeness, which gives this dominating, entrancing power. The coronal region of the amiable sentiments, the whole upper surface of the head, is the source of the benevolent healing power which does not aim or desire to subjugate others. This benevolent power is nowhere so effective as at its origin in the brain, and the application of the upper surface of the head to the patient or to any painful or diseased part is the most

soothing restorative treatment possible. It is remarkable that with all the vast amount of experience in Animal Magnetism nothing should have been known or suspected of this. The whole subject has been dominated by a spirit of blind routine, more monotonous than that of the medical profession. Deleuze himself says: "Magnetism, if it has been practised empirically from a high antiquity, has not at least formed a particular science, except for a small number of years. Magnetism cannot take its rank among the sciences, and present a doctrine of which application may in all cases be made, until physicians take it up seriously." But the hard, mechanical character which the medical profession has assumed utterly disqualifies it for investigating so profound, so delicate, so psychic a subject. It has not even been able to develop the rational principles of electric practice.

The remark that some magnetizers act by the will alone indicates that in them the region of Will is largely developed, — the region of Firmness, which is assisted by all the occipital organs, — and that they have the psychic temperament derived from the interior regions of the brain, which brings them into rapport with persons at a distance, or into intimate sympathy with those who are near.

But little more need be said of Therapeutic Magnetism as presented by Deleuze. There is very little of it, beyond a limited formula, or rules of proceeding, which might be fully expressed in three or four pages, and which certainly has no claim to be considered a science or a scientific art. But the volume of his "Practical Instruction," reproduced in this country by T. C. Hartshorn, of Providence, R.I., is filled with gossipy details, good advice to magnetizers, descriptions of cases and their treatment, which certainly show success in the practice, and numerous illustrations of somnambulism and clairvoyance, mainly added by Mr. Hartshorn, with the testimony of physicians, making an aggregate of documentary evidence so weighty and convincing that it exhibits in a clear light the remarkable stolidity of medical colleges in continuing to treat facts so well established with silent scorn or open hostility, and at last endeavoring to reduce the whole subject to the coarse, mechanical proceeding which they call *massage* or rubbing.

I have shown that the somnambulic, clairvoyant and entranced conditions which constitute the mass of the phenomena of Animal Magnetism are the results of the predominance of certain faculties with which all mankind are endowed in various degrees, and which may be elicited by direct stimulation of their organs by the fingers or hand, and by galvanic currents.

To produce the sleep or trance of insensibility, the organ of Somno-

lence in the temples may be excited, or it may be produced by placing one hand at the epigastrium on the median line, just below the sternum, and the other on the back just behind the middle of the humerus, and below the shoulder-blade, which tends to a deep sleep. The insensibility to pain may be promoted by placing the hand upon the shoulder, from the acromion process (the external and upper surface of the shoulder) extending three or four inches inward.

Possibly this volume may do something to overcome medical prejudice by showing the facility with which the neurological laws of the human constitution may be demonstrated by Galvanism. But scientific testimony seems to produce very little effect when it is resisted by materialistic dogmatism. In addition to the testimony of a very large number of physicians as to the reality of the magnetic phenomena, the two most eminent of all French scientists, Cuvier and La Place, have given attestation of their truth.

Cuvier says in his Comparative Anatomy: "The effects produced upon persons who *before* the operation (of mesmerizing) was begun were in a state of insensibility; those which have taken place upon other persons after the operation itself has reduced them to that state; and also to the effects produced upon brutes, — *no longer permit it to be doubted* that the proximity of two animated bodies, in a certain position and with the help of certain motions, do produce a *real effect, wholly independent of the imagination of either.* It is also evident that these effects are owing to a communication which takes place between the nervous systems of the two parties." The testimony of La Place in his great Treatise on the Calculation of Probabilities is equally positive and explicit.

The eminent physiologist Georget said: "I have seen, positively seen, a great many times, somnambulists announce several hours, several days, twenty days beforehand, the hour, the minute even, of the attack of epileptic and hysteric fits, and of the menstrual eruptions, and indicate the duration and the intensity of the attacks, — things which were actually verified."

The existence of these intuitive and prophetic powers in man I have demonstrated in developing the science of Psychometry, and pointed out their location; and in Sarcognomy I place the entire *modus operandi* in the possession of the public, of which for many years probably only the most enlightened will avail themselves.

Let us not forget that Dr. Elliotson, at the head of the medical profession in London, was driven into retirement for attempting to introduce in England the magnetic anæsthesia in surgical operations, after the Committee of the Royal Academy of Medicine at Paris in 1836 had made the following statement of the success of Cloquet in

operating during the somnambulic trance, — a specimen of the large class of facts of which the present generation of physicians have been carefully kept in ignorance by their professors, — an ignorance which they are most faithfully transmitting to their successors.

The report made in 1831 — signed by Bourdois de la Motte, president; Fouquier, Gueneau de Mussy, Guersent, Itard, J. J. Leroux, Marc, Thillaye and Husson — says: —

"You have all heard of a fact which at the time fixed the attention of the Chirurgical Section, and which was communicated to it at the session of April 16, 1829, by M. Jules Cloquet. The committee thought it their duty to embody it in this report, as one of the least equivocal proofs of the power of the magnetic sleep. It relates to Madame Plantin, aged sixty-four years, living at 151 Rue Saint-Denis, who consulted M. Cloquet, on the 8th of April, 1829, about an ulcerated cancer on her right breast, which she had had many years, and which was complicated with a considerable enlargement of the axillary ganglions. M. Chapelain, the physician of this woman, whom he had magnetized for some months, with the intention, as he said, of reducing the enlargement of the breast, had been able to obtain no other result than a very profound sleep, during which her sensibility appeared annihilated, but the ideas preserved all their lucidity. He proposed to M. Cloquet that he should operate upon it while she was plunged into the magnetic sleep. M. Cloquet, considering the operation indispensable, consented to do it; and it was agreed that it should take place on the following Sunday, April 12. The two evenings previous, this woman was magnetized several times by M. Chapelain, who disposed her when in somnambulism to support the operation without fear, and even led her to speak of it with composure, while as soon as she waked she repelled the idea with horror.

"On the day appointed for the operation, M. Cloquet, on his arrival at half past ten o'clock in the morning, found the patient dressed, and seated in an arm-chair, in the position of a person peacefully wrapped in a natural sleep. It was nearly an hour since she had returned from mass, which she always attended at the same hour. M. Chapelain had put her into the magnetic sleep since she came back. The patient spoke with great calmness of the operation she was about to undergo. Every arrangement having been made for the operation, she undressed herself and sat down upon a chair.

"M. Chapelain held the right arm, the left arm being suffered to hang by her side. M. Pailloux, a student of the Saint-Louis Hospital, was charged to hand the instruments and to make the ligatures. First an incision was made from the armpit, above the tumor, to the inner side of the breast. The second, commencing at the same

point, separated the tumor below and passed round to meet the first. M. Cloquet dissected the enlarged ganglions with caution, on account of their proximity to the axillary artery, and took off the tumor. The time consumed in the operation was ten or twelve minutes.

"During all this time the patient continued to converse tranquilly with the operator and did not exhibit the slightest sign of sensibility: no movement of the limbs or *of the features*, no change *in the respiration, nor in the voice*, no emotion, not *even in the pulse*, were manifested; the patient did not cease to be in the state of self-forgetfulness and passive insensibility in which she was several minutes before the operation. They were not obliged to hold her; they merely sustained her. A ligature was applied to the lateral thoracic artery, which was exposed during the extraction of the ganglions. The wound was closed with sticking plaster and dressed; the patient was put on the bed, still in the state of somnambulism, and left there forty-eight hours. An hour after the operation a slight hemorrhage ensued, which did not continue. The first dressing was removed on the succeeding Tuesday, April 14. The wound was cleansed and dressed anew: the patient manifested no sensibility nor pain. The pulse reserved its natural beat.

"After the dressing had been put on, M. Chapelain awoke the patient, whose somnambulic sleep had lasted ever since one hour before the operation, that is to say, for two days. This woman did not appear to have any idea or any impression of what had passed; but, on learning that she had been operated upon and seeing her children around her, she experienced a very lively emotion, which the magnetizer terminated by putting her asleep immediately."

The report of the commission fully confirmed the claims of the friends of Animal Magnetism, giving some interesting illustrations of clairvoyance and the power of somnambulists to prescribe successfully for the sick. Two centuries previously, in France, during the time of Richelieu, Grandier was condemned and burned alive for the exercise of the powers which this commission commended as a matter of science. Unfortunately the medical profession during the last half century has been retrograding in this matter towards seventeenth-century ignorance.

Notwithstanding the vast number of public and private exhibitions of the power of clairvoyance, a brutal hostility to this faculty has been exhibited by many of the leaders of the medical profession, and I think it well to republish here one of the best illustrations of this power.

Rev. E. B. Hall, of Providence (Dec. 1, 1837), stated in reference to Miss Brackett: "I have seen a sealed letter containing a passage inclosed in lead, which letter she held at the side of her head not

more than a moment, all in sight, then gave it back to the writer, and afterward wrote what she had read in it. The letter was opened in my presence, and the two writings agreed in every word, there being two differences in spelling only."

In another instance Mr. S. Covill of Troy, being skeptical, wrote a sentence on paper without any one's knowledge, inclosed it between two thick cards, folded the whole up in deep-blue paper, sealed it with his own seal and a number of wafers, and put it all into a larger sheet directed to Mr. Isaac Thorpe ; this sealed letter, as he received it, was presented by Mr. Thorpe to Miss Brackett in the presence of quite a number of gentlemen, requesting her to read it without breaking the seals. She took the letter with her on retiring for the night, and in the morning dictated the following as its contents, which was written down by Mr. H. Hopkins : —

"No other than the eye of Omnipotence can read this in this envelopement. * * * * 1837."

The stars represented a portion she could not read. The letter was returned with the seals undisturbed, and her reading was published before the answer was received. Mr. Covill stated that the reading was : "No other than the eye of Omnipotence can read this sentence in this envelope. Troy, New York, August, 1837." Thus the reading was correct in everything but the local date and the word "sentence," which was omitted.

These marvellous powers of the soul and brain, which the cultivators of Animal Magnetism have demonstrated so many thousand times without overcoming that hostility which springs from the coarser elements of human nature, are now clearly intelligible, since I have traced them to their location in the front lobe of the brain, and shown how they may be evoked.

The vast number of illustrations of clairvoyance and of the power of the disembodied soul during the last thirty years, and the vast number of cures effected by human vitality without medicine and without learning, would have wrought an entire revolution in philosophy and therapeutics if the educated classes had been taught to reason.

The great need of the age is a true education, which will enable all classes to welcome and appreciate new truth.

The progress of the higher departments of science and philosophy is not like the steady growth of physical science, but is rather a matter of accidental impulse, local fashion and prejudice. The systematic cultivation of Animal Magnetism has been neglected. The study of the brain by comparative developement has been almost forgotten, although it vastly exceeds in interest and value all other methods in natural history and ethnology.

My own experimental investigation, which organizes a positive and complete Anthropology, has not been sufficiently urged to enforce its proper consideration. The marvellous facts of spiritualism, and the diagnostic and healing powers which it has developed, are now the chief objects of interest with progressive minds, and our therapeutic science is about to be enriched by the partisans of psychic methods, who discard all physical means, as the medical profession has discarded the psychic. Every step in that direction is an advance towards higher conditions. The marvellous cures, so numerous and well attested, achieved by prayer, faith, spirit agency and what has been called "mind cure," far transcend the achievements of medical therapeutics, and the question is being determined by experience, to what extent these psychic agencies can be substituted for the physical means upon which the world has heretofore relied.

The partisans of physical science have confined themselves rigorously to physical methods, forgetting that man is an eternal spiritual being, even while dwelling in a material form. If the partisans of psychic science, ignoring physical means, treat the soul alone, we may obtain comparative statistics of the two methods, and the true philosopher, comprehending each, will avail himself of both. The student of Sarcognomy should be prepared to avail himself of manual, psychic, electro-magnetic, pneumatic, medical, solar, hydrotherapic, auto-therapeutic and all other possible methods. By auto-therapeutics I refer to self-treatment by mental power and hygienic exercises which appear to be capable of remodelling the constitution. (See CHAPTER ON HYGIENE.)

How widely different from the monotonous imbecility of Deleuze is the practical exposition by Dr. JAMES ESDAILE of his medical and surgical application of Animal Magnetism in India, in the volume "Mesmerism in India," published in 1846, — showing his observations during six years,— a work which no candid person can read without realizing the guilty folly of the medical profession in ignoring and opposing so valuable a portion of therapeutics! It was his intention at first to communicate his observations only to the medical profession, but he soon felt it his duty to give them to the public.

Dr. Esdaile's report embraces seventy-three surgical operations and eighteen medical cases treated by Mesmerism with complete success, and shows how simple is the practice and how brilliant are its results in India. A student of Sarcognomy in that climate, even if he dispensed with medicine entirely, would have a brilliantly successful practice that might astonish the adherents of the old regime. Dr. Esdaile regrets that the public should wait for a professional sanction of Mesmerism; for, says he, "medical men in general as yet know nothing

about it; and there is nothing in their previous knowledge, however great and varied, that bears upon the subject." "I fear that not many of this generation will live to benefit by Mesmerism, if they wait till it is admitted into the Pharmacopœia." He speaks of the opprobrious language applied to those who succeed in curing diseases without medicine, and adds "in my estimation the genuine medical quack is he, who professing to cure disease, yet allows his patients to suffer and perish by ignorantly or presumptuously despising any promising or possible means of which the Father of Medicine thought very differently from his degenerate sons."

As to producing insensibility, he says: "In singularly sensitive persons, the extreme degree of coma, so intense as to permit the performance of surgical operations without awaking the patient, may sometimes be obtained in a few minutes, but in general it takes an hour or two, and the process often does not succeed till the second or even fourteenth time." Nevertheless in India the results were very promptly produced, and he says: "Finding it impossible after the first month to prosecute the subject in my own person, owing to the great bodily and mental fatigue it caused — for I had spared neither — I set to work my hospital attendants, young Hindoos and Mahomedans, and such has been my success that every one I have taught has become a skilful mesmerizer."

Believing that Mesmerism as a natural mode of cure must have been known from the most ancient times, though disguised as magic or mystery, Dr. E. made the acquaintance of a famous magician of Bengal, and professing to be a brother magician succeeded in persuading him to show his process for relieving pain. The magician "sent for a brass pot containing water, and a tray with two or three leaves upon it, and commenced muttering his charms at arm's length from the patient. In a short time he dipped his forefinger into the water, and with the help of his thumb, flirted it into the patient's face; he then took the leaves, and commenced stroking the person from the crown of the head to the toes, with a slow, drawing motion. The knuckles almost touched the body, and he said that he could continue the process for an hour or longer if necessary, and it convinced me that if these charmers ever do good by such means, it is by the Mesmeric influence." Dr. E. then proposed to show his charm by operating on the magician.

"After some difficulty we got him to lie down, and to give due solemnity to my proceedings, I chanted as an invocation the chorus of the "King of the Cannibal Islands." I desired him to shut his eyes, and he clenched his eyelids firmly that I might find no entrance to the brain by that inlet. In a quarter of an hour he jumped up and

said he felt something disagreeable coming over him and wished to make his escape. He was over-persuaded to lie down again, however, and I soon saw the muscles around the eye begin to relax, and his face became perfectly smooth and calm. I was sure that I had caught my brother magician napping, but in a few minutes he bolted up suddenly, clapped his hands to his head, cried he felt drunk, and nothing could induce him to lie down again." He quickly escaped and confessed next day that he was overcome by the sleepy influence.

The process of the magician as well as Dr. Esdaile was simply long passes from the head to the feet — a natural mode of producing sleep as has already been explained.

Dr. Esdaile's attention had been directed to Animal Magnetism not only by the manly declarations of the famous Dr. John Elliotson of London, but by the admissions of its opponents — notably those of the Roman Catholic Church. The action of this body, as hostile to psychic science as it was once to astronomy, is worth reproducing here, as a statement and admission of facts which have long been familiar to the intelligent.

In May, 1841, the Archbishop of Lausanne and Geneva addressed to the Sacred Penitentiary at Rome the following remarkable document. By a curious coincidence this was the very time at which I had discovered and announced the nervauric impressibility of the brain, the time at which Esdaile began his operations in India and Dr. Braid began his investigation of hypnotism in England : —

"MOST EMINENT LORD, — Since that which has been hitherto answered respecting Animal Magnetism seems by no means to suffice, and it is much to be wished that cases not unfrequently occurring may be solved more and more uniformly, the undersigned humbly lays before your Eminence that which follows :

"A magnetized person, who is generally of the female sex, enters into that state of sleep called *Magnetic Somnambulism* so deeply, that not even the greatest noise at her ears, nor any violence of iron or fire, is capable of raising her from it. She is brought into this kind of ecstasy by the magnetizer alone, to whom she has given consent (for consent is necessary), either by various touches or gesticulations, when he is present, or by a simple command, and that, too, an internal one, when he is at a distance of even several leagues.

"Then, being interrogated, aloud or mentally, concerning her own disease, or those of absent persons entirely unknown to her, this person, who is evidently one unlearned, at once exhibits great superiority in science to medical men ; announces most accurately anatomical matters ; indicates the cause, seat, and nature of internal diseases in

the human body, which, to the skilful, are most difficult of understanding, and unravels their progress, variation and complications; and this in the terms proper to them, and prescribes the most simple and efficacious remedies.

"If the person concerning whom the magnetized woman is consulted is present, the magnetizer establishes the relation between them by means of contact. If, however, he be absent, a lock of his hair supplies his place, and suffices; for, when this lock of hair is brought into the proximity only of the hand of the magnetized person, he declares what it is (without casting his eyes on it), whose hair it is where the person is actually sojourning, to whom the hair belongs, what he is doing, and affords the above-mentioned information respecting his disease not otherwise than if, after the manner of medical men, he were inspecting the interior of his body.

"Lastly, the magnetized person does not see with the eye. The eyes being covered, though not knowing how to read, he will read off whatever is placed on his head or stomach, whether a book, or manuscript, open or shut. His words, too, seem to issue from this region: but when brought out of this state, either at the order, even internal, of the magnetizer, or, as it were, spontaneously at the moment previously announced by himself, he appears to be not at all conscious of the things gone through by him in the paroxysm, how long soever it may have lasted: what may have been demanded of him; what he may have answered; what he may have undergone; all these things have left no idea in his understanding, nor the least vestige in his memory.

"Therefore, the undersigned petitioner, seeing valid reasons for doubting whether such effects, the occasional cause of which is shown to be so little proportioned to them, be simply natural, earnestly and most fervently prays that your Eminence in your wisdom, for the greater glory of the Omnipotent, as well as the greater good of souls, which have been redeemed by the Lord at so great a price, may be pleased to decide, whether, admitting the truth of the premises, a confessor or curate may safely permit to his penitents or parishioners:

"1. That they practise animal magnetism, endowed with such, or other like characteristics, as an art auxiliary and supplementary to medicine.

"2. That they consent to be thrown into such a state of magnetic somnambulism.

"3. That they consult persons magnetized in such a manner either concerning themselves or concerning others.

"4. Or that they undertake one of these last-mentioned three things, having first taken the precaution of formally renouncing in

their minds every diabolic compact, explicit or implicit, as well as all satanic interventions, since, notwithstanding such precautions, similar effects or some such effects have been obtained by some persons.

"Most Eminent Lord, by command of the Most Rev. the Archbishop of Lausanne and Geneva, your Eminence's most humble and most obedient servant, JAMES XAVIER FONTANA,

"Chancellor of the Episcopal Chancery.

"Friburgh, in Switzerland, Episcopal Palace,
the 19th of May, 1841."

RESPONSE.

"The Sacred Penitentiary, the premises having been maturely weighed, considers that these should be answered as it now answers: The use of Magnetism as set forth in the case is not permissible.

"Given at Rome, in the Sacred Penitentiary, the 1st day of July, 1841.

"C. CARD. Castracane, M. P.

"PH. POMELLA, of the S. P. Sec'y.

"Certified as a copy conformable to the original. — Friburgh, the 26th July, 1841.

"By order — J. Perroulaz, Sec'y of the Bishopric."

"It will be observed (says Dr. Esdaile) that though the subject is held in dread by the reporter, as probably of diabolical origin, yet it is treated as a 'great fact,' known to and believed in by a large community, so that Catholics and Protestants are found alike professing a belief in Mesmerism. If the twentieth part of what was reported was true, it well deserved careful investigation; and, as I had no dread of knowing anything that God has permitted to be known, I determined to try to find out the truth for myself, on the first favorable opportunity. In choosing a proper subject to experiment upon, I should probably have selected some highly sensitive female of a nervous temperament and excitable imagination who desired to submit to the supposed influence. But, I beg it to be particularly remarked, my first essay was not guided by theory and was not made on a subject supposed to be favorable. On the contrary, the very worst specimen of humanity, theoretically considered, was the person destined to be my first mesmeric victim: he being none other than a Hindoo felon of the hangman cast, condemned to labor on the roads in irons. Accident alone determined my choice and decided the matter for me, perhaps much better than theory would have done; for I should as soon have thought of commencing operations on the

first dog or pig I met on the road, as of selecting this man for his good mesmeric 'matériel.'

"*First Experiment.* — Madhab Kaura, a hog-dealer, condemned to seven years' imprisonment, with labor on roads, in irons, for wounding a man so as to endanger his life, has got a double Hydrocele. He was ordered to be taken from the jail to the Charity Hospital, to be operated upon.

"April 4th. — The water was drawn off one side of the scrotum, and two drachms of the usual cor. sub. injection were thrown in. On feeling the pain from the injection, he threw his head over the back of the chair, and pressed his hands along the course of the spermatic cords, closing his eyelids firmly, and making the grimaces of a man in pain. Seeing him suffering in this way, I turned to the native sub-assistant surgeon, an *élève* of the Medical College, and asked him if he had ever seen Mesmerism. He said that he had seen it tried at the Medical College, but without effect. Upon which I remarked, 'I have a great mind to try it on this man; but as I never saw it practised, and know it only from reading, I shall probably not succeed.' — The man continuing in the position described, I placed his knees between mine, and began to pass my hands slowly over his face, at the distance of an inch, and carried them down to the pit of his stomach. This was continued for half an hour before he was spoken to, and when questioned at the end of this time his answers were quite sensible and coherent.

"He was ordered to remain quiet, and the passes were continued for a quarter of an hour longer,— still no sensible effect. Being now tired (thermometer 85°), I gave it up in despair and declared it to be a failure. While I rested myself, the man remained quiet and made fewer grimaces, and when ordered to open his eyes, he said there was a smoke in the room. This roused my attention and tempted me to persevere. I now breathed on his head, and carried my hands from the back of his head over his face and down to the epigastrium, where I pressed them united. The first time this was done, he took his hands off his groins and pressed them both firmly down upon mine, drew a long breath, and said, 'I was his father and mother and had given him life again.' The same process was persevered in, and in about an hour he began to gape, said he must sleep, that his senses were gone; and his replies became incoherent. He opened his eyes when ordered, but said he only saw smoke, and could distinguish no one: his eyes were quite lustreless and the lids were opened heavily. All appearance of pain now disappeared; his hands were crossed on his breast, instead of being pressed on the groins, and his countenance showed the most perfect repose. He now took no notice of our ques-

tions, and I called loudly on him by name without attracting any notice.

"I now pinched him without disturbing him, and then asking for a pin in English, I desired my assistant to watch him narrowly, and drove it into the small of his back; it produced no effect whatever; and my assistant repeated it at intervals in different places as uselessly. His back had continued to arch more backwards latterly, and he now was in a state of 'opisthotonos:' the nape of his neck resting on the sharp back of the chair and his breech on the edge of it. Being now satisfied that we had got something extraordinary, I went over to the Kutcherry, and begged Mr. Russell, the judge, and Mr. Money, the collector, to come and see what had been done, as I wanted the presence of intelligent witnesses in what remained to do. We found him in the position I had left him in, and no hallooing in his ears could attract his attention. Fire was then applied to his knee without his shrinking in the least; and liquor ammoniæ, that brought tears into our eyes in a moment, was inhaled for some minutes without causing an eyelid to quiver. This seemed to have revived him a little, as he moved his head shortly afterwards, and I asked him if he wanted a drink; he only gaped in reply, and I took the opportunity to give, slowly, a mixture of ammonia so strong that I could not bear to taste it; this he drank like milk, and gaped for more. As the 'experimentum crucis,' I lifted his head, and placed his face, which was directed to the ceiling all this time, in front of a full light; opened his eyes, one after the other, but without producing any effect upon the iris; his eyes were exactly an amaurotic person's, and all noticed their lack-lustre appearance. We were all now convinced that total insensibility of all the senses existed, and I ordered him to be placed on a mattress on the floor, and not to be disturbed till I returned. It was now 1 o'clock, the process having commenced at 11 A.M."

In the afternoon, Dr. E. being absent, the man was carried back to jail. He was visited and found to be in good condition. His diarrhœa was suspended, tee inflammation greatly reduced. He recollected nothing after being put to sleep, neither the pricking, the burning, nor the ammonia.

"*Second Experiment.* — April 6th. — 11 o'clock A.M. The inflammation has become high during last night; the part is hot, and excessively tender; the lightest touch causes great pain. Skin hot; pulse quick. I could not resist the temptation of satisfying myself still further and relieve him at the same time. So, turning to the native doctors, I said that I would again try the 'Belatee Muntur' (the Europe charm), and began the process as before: he lying in

bed. In ten minutes the mesmeric haze ('smoke' he always calls it) was produced. After half an hour he still complained of the pain in the inflamed part, and could not bear its being touched; in three-quarters of an hour the coma was established, and I squeezed the inflamed part with no more effect than if it had been a bladder. Having business to attend to in Chandernagore, six miles off, I called, in passing, on the Rev. Mr. Fisher, and said that he might now satisfy himself by going to the hospital in my absence; and that, except mesmeric means, he was at liberty to use every possible means to awake him or make him feel."

Mr. Fisher and Mr. D. J. Money state that the patient was certainly entirely insensible, and they believe he could not have felt it if his leg had been cut off. At 3 P.M. Dr. E. returned, finding the patient as he left him, woke him up by reverse passes, blowing in his face and giving him water. He was free from pain and desired to sleep. On the 7th he complained for the first time of pain in the places where he had been burned and pricked. The statements of Dr. E are attested by the physicians and visitors.

"*Third Experiment.* — April 11th. — Took the sub-assistant surgeon with me to-day to the jail hospital, and desired him to watch the time taken to produce the different effects. There is still considerable pain in the side operated upon. Pulse regular, 60; skin warm. At 11 o'clock A.M. I seated him on the floor with his back against the wall; placed myself before him on a stool, and proceeded pretty much as before. The process, in one particular, was varied; I leaned my elbows upon my knees, placed my mouth over the back of my joined hands, and breathed along their upper surface: the points of my fingers being pointed steadily at his eyes, nose and forehead, in succession. This seemed to be very effectual, and was done with the idea of concentrating the mesmeric influence of the whole body into one conductor. It was curious to observe that he had begun to think on the subject, and was observing the effects for himself, and testing his senses as we proceeded. After manipulating for a few minutes, he opened his eyes, looked sharply and minutely about him, and being asked if he saw quite well, he said, 'Oh, yes.' In a minute or two he repeated his inspection, and answered again that he saw quite distinctly; in seven minutes he again looked about him, seemed surprised, and said he only saw 'smoke.'

"In fifteen minutes he was pinched; and when asked if any one was pinching him, he replied that he could not tell, as I might now cut a piece out of his body without his feeling it. I proceeded to induce the mesmeric coma as quickly as possible; and succeeded in twenty minutes from the commencement. I then said to the sub-

assistant surgeon that I would operate upon him in this state if I could find some of the European gentlemen to be witnesses. On going to Chinsurah, two miles off, I fortunately found a considerable party, consisting of the Baron Law de Clapernou, Governor of Chandernagore; Mr. Russell, the judge; Mr. Wauchope, the magistrate; J. St. Pourçain, Esq.; Mr. Clint, Principal of Hooghly College; and Mr. Clermont, head-master of the Lower School: who all accompanied me back to the hospital. The man had fallen down and was lying on his back. The large gong of the jail was brought and struck violently within a few inches of his ear with no effect. I then pierced the scrotum, and threw in the injection, without any one being sensible of the smallest movement in his face or body. His limbs were quite flexible; but on holding one of his legs in my hand for a few seconds, it gradually became quite rigid, and we could not bend it again; the same occurred in the other leg. The arms were supple and lay in any position into which they were thrown; and when the fore-arm was bent upon the humerus, and then let go, it fell upwards or downwards instantly. But on placing my united fingers over the ends of his, the arm remained fixed at a right angle in the air, and swayed to and fro, according to my movements. The insensibility of the iris was also tested and proved.

"6 o'clock P.M. — Still sleeps; most complete relaxation of all the limbs now exists. The legs and arms can be tossed about in every direction, and where they fall there they lie. Being curious to ascertain the effect of the artificial state on the natural process of inflammation, I did not awake him, but saw that the part was as flaccid as when the water was just withdrawn.

"April 12th. — He awoke at 12 o'clock last night, spontaneously. Recollects nothing after going to sleep; sees the water is gone, knows not how; supposes the Dr. Sahib did it. The testicle is considerably enlarged to-day; there is little pain, and it did not swell till after he awoke. He has had chronic diarrhœa for some time; four and five motions a day, but has had none since yesterday forenoon till this morning. Natural, artificial and diseased actions have therefore been all equally arrested for the last thirteen hours, — a practical fact of the utmost importance, which will not be lost sight of by myself or others, I hope. What a blessed prospect this opens to sufferers who may be sensible to the Mesmeric influence!"

I have given these statements fully, as they show how easily a neophyte may undertake experiments for trance and anæsthesia when a good subject is found. Dr. E.'s method was in accordance with the laws of Sarcognomy. The somnolent trance has its central

locations in the temples just behind the eyes and at the epigastrium. The former is developed by passes from the occiput toward the eyes and nose — the latter by passes to the epigastrium, and holding the hands upon it.

By repeated exercise these faculties become more active, like all others. As, in the cultivation of psychometry, persons who were not aware of possessing the faculty learn in time to exercise it in a quick and penetrating manner, so in the cultivation of impressibility and somniloquence the power is increased. The subject of his first experiment—Madhab Kaura—became so sensitive in one month that Dr. E. says he "can be catalepsed in less than a minute, and the effects are passing strange. If, when he is standing, I point my fingers at him for a few seconds, his eyelids immediately droop, his arms fall by their mere weight to his sides, his whole body begins to tremble, owing to the incipient loss of command over the muscular system ; and if not supported he would fall down in a heap. But give him a moment's support, and he becomes as rigid as a statue, and if the centre of gravity is well poised, he will remain in any posture he is put into, and that for a longer time than I have waited to see. The muscles must be dragged out of the fixed position they have assumed, and allowed a moment to contract in a new attitude, out of the perpendicular ; for if suddenly pushed, he goes down head foremost like a statue from its pedestal, and his life is endangered. However inconvenient or grotesque the position may be, he is equally well satisfied, and continues to sleep quite comfortably, with his heels behind his neck ; and if his forehead is placed against the wall at an acute angle, he remains sticking out from it, like a buttress, longer than I have ascertained."

This is an illustration like thousands of similar cases in the practice of animal magnetism of the condition of an individual in whom the organs of the temples (the anterior portion of the middle lobe) are brought into predominance, destroying the power of the will and making the body a plastic subject for any influence that may operate on the nervous system and assume its control.

The great benefit of this condition lies in the fact that the whole constitution is thus brought under the control of the operator and in sympathy with his will and his whole condition. Hence miraculous cures are very common in patients who are placed in this state, and without any scientific attempt to cure, the absolute sympathy with a healthy and benevolent operator is itself curative, and the patient finds all his troubles relieved by the entranced condition.

The reader, understanding that this condition belongs to the temples (above the cheekbone) and to the epigastric region, will

perceive the necessity of concentrating the excitement from the opposite regions on these locations, when he wishes to make a passive subject, that is, *from* the upper occiput and the shoulders. There are persons in whom this anterior predominance is natural, and who are therefore ready-made subjects. Others more normally balanced may be subdued by the influence of a strong psychic energy, if they place themselves in a passive state, listening to soothing sounds or looking intently at some object near the eyes, which compels them to turn inward in the pathognomic line of Somnolence.*

With a natural sensitive but little effort is necessary, a steady gaze, a few passes, or merely placing the hand at the epigastrium or on the temples or front of the head is sufficient to subdue them. Dr. Esdaile's procedure is described by him as follows:

"The routine followed is this. A person presents himself before me for the first time, and I see he has a disease requiring an operation for its removal; he is desired to go into another room (which is dark) and repose himself after his journey, not a word being said about an operation, as this would cause a mental excitement, destructive to the mesmeric influence. One of my assistants follows him, seats himself (if unperceived, so much the better) at the head of the bed, and, by using the process to be hereafter described, often reduces the patient to a state of coma by the end of my visit; I then do what is necessary, whether it be to take off or to straighten a limb, without his knowledge or consent.".

He gives many illustrations of their insensibility. A woman named Gendo was mesmerized, and muriatic acid was freely applied by Dr. Finch "to a sore covering all the right temple, without her showing the smallest degree of consciousness; and it was with great difficulty that I woke her after he had failed to do so." While being cauterized her pulse sunk from 88 to 80. A few days afterwards, a sceptical Dr. Bedford touched the woman's sore on the temples, when she was awake, with the glass stopper of the muriatic acid, and as she did not immediately cry out he thought he had proved that her insensibility was natural and not mesmeric, but soon she said that her head was on fire and walked about distractedly, in great agony, until Dr. E. bathed her head, threw her into the trance and cut off the tubercles round the sore without her knowledge. Waked up after half an hour, she had even forgotten the burning.

The labors of Dr. E. being directed entirely to overpowering his

* I have not been disposed to practise such experiments, because they place the subject in a passive, controllable condition, and my scientific aim has been to practise investigations in which the phenomena would be unaffected by my own opinions.

subjects, making them passive and unconscious or sometimes imitative, he never developed the psychometric, clairvoyant and prevoyant powers, but displayed the highest degree of controlling power. He considered his patients of too low a grade for intellectual phenomena. The process he used is worth quoting, as he found it successful and it accords with scientific principles:

"Desire the patient to lie down and compose himself to sleep, taking care, if you wish to operate, that he does not know your intention; this object may be gained by saying that it is only a trial, for fear and expectation are destructive to the physical impression required. [They act on the base of the brain.] Bring the crown of the patient's head to the end of the bed, and seat yourself so as to be able to bring your face into contact with his, and extend your hands to the pit of the stomach, when it is wished; make the room dark, enjoin quiet, and then shutting your patient's eyes, begin to pass both your hands in the shape of claws, slowly within an inch of the surface, from the back of the head to the pit of the stomach [this is very appropriate]; dwelling for several minutes over the eyes, nose and mouth, and then passing down each side of the neck, go downwards to the pit of the stomach, keeping your hands suspended there for some time. [This is proper: the region of the eyes, nose and *upper* part of the face is highly conducive to an amiable and intelligent somnolence; but the impression should not extend *below* the upper lip, as the lower part of the face has an exciting influence. A strong impression at the epigastrium is proper to deepen the impression and procure a profound sleep. A more intellectual somnolence would have been procured if he had concentrated the impression a little higher, at the end of the sternum.] Repeat this process steadily for a quarter of an hour, breathing gently on the head and eyes all the time. [This is not really *necessary*, but aids the effect by imposing the nervaura of the operator on the subject. For the same reason, it is often sufficient merely to place the hand on the forehead. The nervaura of a strong brain overpowers a weak and passive one in contact or even without it. A strong operator controls the passive by mere presence and force of character. That incongruous medley of vague assertion called 'Christian Science' was imposed upon a class of credulous persons by the great magnetic energy and dominating force of its first propagandist. The aura of a strong brain penetrating a passive one brings the latter not only into sympathy but under the control of the will, which extends its dominion beyond the nervous system to which it belongs into any nervous system which yields to it.] The longitudinal passes may then be advantageously terminated, by

placing both hands gently but firmly on the pit of the stomach and sides. The perspiration and saliva seem also to aid the effect on the system. [Whatever he may mean by 'sides,' it is not appropriate to place the hands on any part that could be called sides, unless it be the sides of the chest, in its upper part. On the sides of the abdomen distinctly below the ribs, the influence would be subduing and relaxing, and this influence appears in his reports.]

"It is better not to test the patient's condition by speaking to him, but by gently trying if the cataleptic tendency exists in the arms. [This is giving up the intellectual for the passive phenomena. Somniloquence (sleep-talking) should be encouraged if we want intellectual phenomena, and the impression should be made at the lower end of the sternum, instead of the abdomen.] If the arms remain fixed in any position they are left in, and require some force to move them out of every new position, the process has been successful; the patient may soon after be called upon by name, and pricked, and if he does not awake, the operation may be proceeded with. It is impossible to say to what precise extent the insensibility will befriend us. The trance is sometimes completely broken by the knife, but it can occasionally be reproduced by continuing the process, and then the sleeper remembers nothing; he has only been disturbed by a nightmare, of which on waking he retains no recollection."

Catalepsy is an abnormal state in which I perceive no benefit and have avoided its production; but it is a prominent matter among some of the medical dabblers in magnetism who are not seeking curative or beneficial effects.

Dr. Esdaile had to seek efficient means for removing the profound cataleptic trances that he produced, and not understanding the principles of Sarcognomy, which would suggest passes from the abdomen to the shoulders and the crown of the head, he resorted to currents of air and water which have a cooling and dispersive effect. "Blowing in the eyes" and "pouring water from a height" were used to release the brain. One of his patients being helplessly cataleptic and rigid, "I then blew on his neck, thereby immediately releasing it." "One arm was freed in the same way; then the other." "I also showed that my breath had no specific effect, by doing the same thing with a fan; a current of air being all that was required to dissolve the rigidity of the muscles." Dispersive passes are the controlling agents; and a breeze would not have had the same effect independent of the operator.

Cold is also potent to resist the magnetic influence, being a tonic and an antagonist to impressibility and sensibility. This he

observed, and states as follows: "On several occasions I have entranced persons standing, stripped them naked, and catalepsed them in the most painful postures imaginable, and in these they would remain an incredible length of time; but let a little cold water be squirted from a distance on any member, and it became instantly relaxed. If both arms were fixed perpendicularly in the air, one after the other was shot down instantly by a slight stream of water; and if it was directed to the calf of the leg, the person fell as if he had been hamstrung; or if the body was catalepsed out of the perpendicular, squirting water on the loins would send the patient head foremost against the ground. Blowing on or rubbing any part had the same effect; but the general torpor is often too deep to exhibit those sensibilities, and such persons are awaked with great difficulty by the use of all the demesmerizing agents."

If we would avoid this extreme mesmeric prostration, we should not suppress entirely the functions of the shoulders and upper occiput, but, by applying the hands there occasionally, sustain the vital stamina.

Our knowledge of the effects of cold teaches us that for all nervauric and psychic experiments there should be a warm atmosphere in the apartment, and I would add, there must be moral warmth as well as physical.

The most remarkable claim for animal magnetism, the power of impregnating water with a vital influence, was verified by Dr. Esdaile with a female patient named Abunga, as follows: "In the presence of my hospital attendants, I to-day took an ounce of water from the common reservoir and mesmerized it, putting the like quantity of plain water into another glass. We then went into the woman's ward, and I gave the plain water, at first very slowly, asking her if it had any taste? 'It was only plain water,' she said; I then gave her the other; after waiting some time, she said it was different from the first, that it was sharp to the tongue and created a warmth in the stomach. Almost immediately her countenance began to change; she insisted upon getting up to walk, and I immediately saw that she was a somnambulist; after taking a few staggering steps, she would have fallen, but was prevented and taken back to bed, where she instantly sank into the mesmeric coma, and remained so for hours." Next day he repeated the experiment with similar results, to gratify a clergyman, and on the following day varied it by sending a gentleman who knew nothing of mesmerism to give the woman a vial of mesmerized water and report the effects. In both cases she was thoroughly mesmerized by the water and had fantastic visions. He reports seven other similar experiments, those on

patients proving very beneficial, and adds that it would be tedious to report his numerous other cases. Such experiments are very familar to magnetic practitioners, and in this country a great number of patients have been successfully treated by magnetized paper.

Space forbids any extensive quotations from Dr. Esdaile's interesting work, which faithfully records his experience with 91 surgical and medical cases.

To satisfy himself that there was a personal magnetic influence in his experiments, independent of imagination or the impression made by seeing him, he obtained a blind man for a subject, and operated upon him by passes, and also by a steady gaze at a distance of twenty yards, producing in each case the cataleptic unconsciousness. To complete the demonstration, he operated upon the man at the hospital while he was sitting, engaged in conversation, there being a wall between them. In seventeen minutes the man ceased to speak, "and burst into a fit of convulsive crying; I now pulled him by the hair, and he fell back like a person just dead, and slept for three hours."

This power of control was once displayed by Dr. E. in court, when a man was on trial at Hooghly, for kidnapping a boy by magnetic influence. To show the possibility of this, three subjects were brought into the court, and he showed that he could magnetize and lead them anywhere unconsciously, but when brought back they would deny that anything had occurred when he woke them. Of one of them he says:—

"Madhab was put in the dark, and he did not see me in entering. The judge and Moularies engaged him in conversation, and while he was speaking with animation and intelligence, I catalepsed him from behind while in the usual praying attitude of a prisoner at the bar, and in a moment he ceased to speak or hear. I was told by those in front that his lips moved as if in the act of speaking after he ceased to be heard. He was so deeply affected that all motive power was nearly extinguished, and I had to push him from behind with my finger to make him walk; he walked a few yards with difficulty, and then becoming suddenly rigid from head to foot, a slight push sent him headlong down upon the floor, in a most alarming manner; the fit of rigidity was so instantaneous that I was not aware of it. He was revived with some difficulty and fortunately was not injured by his fall."

This exposition of animal magnetism in India will be instructive to those who wish to experiment in abnormal phenomena; but a master of Sarcognomy will readily perceive how much more might have been accomplished by science in the treatment of diseases.

There has been but little of the scientific spirit in the cultivation of animal magnetism; and its cultivation by the Faculty under the name of hypnotism has not been in the scientific spirit of developing truth, but rather in the spirit of dogmatism, endeavoring to suppress all the facts outside of a rigid materialism, and thus ignoring its wonderful power in healing diseases that defy medicine, and developing a wonderful intellectual power.

The *rationale* of the mesmeric somnolence and the suggestible condition cultivated as hypnotism has not been developed either by the scientific or the unscientific students of this subject.

Mesmeric somnolence is mainly produced by the faculty of *Fascination* in the operator (which belongs to the lower occiput, in which all the dominating faculties are located), — a faculty manifested with great power by serpents. This faculty is correlative with that of Somnolence, upon which it operates to elicit its action as dignity elicits reverence. Those with a large occiput have great mesmeric power or capacity for control.

The medical faculty, to avoid recognizing psychic powers, have confined themselves to operating through vision to break down the independent self-protective energies of the subject, without understanding the philosophy of their method. The faculty of vision, exercised by the eyes and the perceptive convolutions of the brow, is correlative with the energetic faculties of the lower occiput, and so closely associated with them as to have led Ferrier to believe that vision was actually located in the lower occiput, in the *gyrus angularis*. Vision rouses our energies and *vice versa*, our energies give power and activity to vision. The law of vision is incessant change. The monotony of a fixed impression destroys the power of every sensitive and perceptive faculty. Hence the fixation of the eyes upon any object deadens the perceptive power and tends to suspend all intellectual action by paralyzing its basis, while at the same time it greatly enfeebles or nearly paralyzes the lower occipital region, of which the *gyrus angularis* is a centre. This occipital paralysis makes a passive character unable to resist fascination, authority or command; and when there is not much natural independence or force of character, the subject is reduced to entire passiveness. The credencive impressibility or credulity (accepting whatever is asserted) belongs to the ideal region extending from Sensibility to Imagination, Marvellousness and Spirituality. The antagonism to this, which protects from credulity, is in the skeptical region just posterior to Combativeness, and when the lower occiput is paralyzed there is no protection against an unlimited credulity. If the upper occiput is also paralyzed there is no protection against an unlimited impressibility.

Thus we see the suggestive conditions of the fashionable hypnotism are due to an impairment of the normal strength and dignity of character, — a demoralizing process, which is the very opposite of true education and moral improvement. Hence I have avoided the use of such processes. I do not deny, however, that the practitioner of Sarcognomy may be justified in using this paralyzing process as an accessory, in cases of disease, to bring the patient more completely under his power. The fixed gaze at an object near his nose will greatly increase the passive impressibility of a patient.

P. S. The history of Mesmerism is one of the saddest illustrations of the power of bigotry, aided by college authority, to interrupt, discourage and suppress the cultivation of Sciences which are not on the animal plane of strict materialism. No amount of scientific proof, of philosophic exposition, or of practical success can overcome this *organized stolidity*, the basis of which is the strength of the lower animal nature. The unfailing and benevolent demonstrations of animal magnetism from the early ages of Egypt and Greece to the present time have not induced the medical colleges to investigate its cures and seek their philosophy. German and French literature give ample illustration of its merits, and in England we have the writings of Gregory, Elliotson, Esdaile, Colquhoun, Ashburner, Engledon, Townshend, Sandby and many others, with the moral support of such men as Sir Bulwer Lytton, Sir Wm. Hamilton, Archbishop Whateley, Miss Martineau, Sir Thos. Brisbane (President of the Royal Society of Edinburgh) and many others, but the attitude of the colleges has not been changed. It would seem as though a college corporation is a remnant of the dark ages, impenetrable to modern civilization.

Enlightened citizens, however, will see that, crude and unscientific as it is, the healing power of magnetic practitioners often transcends very far the power of collegiate medicine. The change from unscientific magnetism to Scientific Sarcognomy will make a still greater contrast to the limited resources of the old colleges. Every practitioner of magnetic treatment can furnish a list of cures which could not be effected by the old faculty, and of lives saved which collegiate practice had abandoned in despair.

In Davey's little manual, the "Practical Mesmerist," we find his authenticated cures of six cases of dumbness beyond the power of the faculty (one deaf and dumb), one of deafness of twelve years, one of painless amputation of the arm, seven of painless extraction of teeth, one of sciatica, two of rheumatism, one of neuralgia of the leg, and one of paralysis, — all of which the faculty had failed to relieve, — two of tic douleureux, one of epilepsy, one of nervous debility incurable by the faculty, one of hopeless insanity, one of a diseased knee pronounced incurable, one of locked jaw, one of rheumatism of twenty-five years (Sir T. M. Brisbane) incurable by the faculty, one of Archbishop Whateley (rheumatism) after the doctors had failed. A very large number of cures are reported by the Scottish Mesmeric Association, the Dublin Mesmeric Association and the London Mesmeric Infirmary.

CHAPTER XVII.

MECHANO-THERAPY — INCLUDING MASSAGE.

Mechano-therapy a quackery — Works of Schreiber and Murrell — French names for massage — Pedantic trivialities — Superiority of methods of barbarians, Sandwich Islanders, Chinese, Egyptians — Painful processes of mechano-therapy — Superiority of those not taught by the colleges — Old practice of Drs. Balfour of Edinburgh, Grosvenor and Cleobury of Oxford — Greatrakes' cures in 1662 — Collegiate opposition — Liberal sentiments of Hoffmann — Professional prejudice — Mechanical benefits of massage — Pretentious pedantry of the books — Ignorance of Ling, the author of Swedish movement-cure — Practice recommended by Schreiber — Mechanical treatment of narcotic poisoning — Transfer of vital force — Treatment of sprains — Mechanical treatment of the tonsils, the womb, tumors, œdema and diseases of the eye — Miscellaneous imperfect treatment — Superiority of the nervauric — Professional treatment of sprains — Concussion with the hands — Japanese shampooing — Summary estimate of mechano-therapy.

THE treatment of disease by vital power applied with the hand appears to a mind afflicted with mental amaurosis a mere mechanical proceeding. Such is the condition of mind in the old medical colleges. That the patient is affected without contact does not enlighten them, for the patient may be controlled by imagination. That blind men are successfully treated without contact; that patients are affected through walls by an unseen operator, or by an operator at a great distance; and finally that the vital emanation (which they deny) will produce the same effects when lodged in water, so as to mesmerize the subject,— these decisive facts they simply evade, ignore, and refuse their publication, holding fast to their ignorance. The very decisive fact that a piece of writing will convey all the psychic, physiological and pathological conditions of the writer to one experienced in psychometry is also ignored, notwithstanding my extensive publication and its acceptance among the enlightened.

A natural consequence of this mental amaurosis is that the gentlemen who see nothing but mechanical forces in manual treatment have made a vigorous attempt, with no little industry, to show what mechanical treatment will do, and to impose their mechanical notions on the public as a complete development of science.

Hence we have *Mechano-Therapy*, of which *massage* is nearly the sum total, and though comparatively a meagre affair, it deserves some attention, as it has been cultivated so vigorously and all its possibilities developed by about two hundred medical authors, — not one of whom I believe has had sufficient sagacity and independence to study nature

in a candid manner and get rid of the collegiate amaurosis, so as to recognize physiological effects produced without mechanical contact.

The best and most original work that I have seen on Mechano-Therapy, that of Dr. Schreiber,* proprietor of a sanitarium at Alpenheim, Austria, is worthy of a review to show the best results of medical experience in mechanical treatment in Europe.

Massage, derived from the French *masser*, to knead, is not sufficiently comprehensive to include Mechanical Therapia in general, but is used as a popular expression for the manual treatment to which many physicians have endeavored to give an undue importance. Considering the false principle which pervades it, and its false assumption of being all that science can recognize in manual treatment, I think it not unjust to call it a system of MECHANICAL QUACKERY, well contrived to deceive the public and to hinder the progress of science. Quackery is a proper term for false principles, combined with pedantic technicalities and a disregard of demonstrated science. The benefit of massage or rubbing was at least as well understood by Hippocrates as by the two hundred verbose recent writers on the subject. He says: "Rubbing can bind and loosen, can make flesh and cause parts to waste. Hard rubbing binds, soft rubbing loosens, much rubbing causes parts to waste, moderate rubbing makes them grow."

Massage — according to Prof. Wm. Murrell, F.R.C.P. of London, who follows Prof. Von Mosengeil, and refers also to Mesger, Reibmayr, Estradere, Norstrom, Gopadge, Zabludowski, Lee and Graham — is a very scientific process, *which requires two years to learn it well, and which, unless controlled by the physicians, will degenerate into "arrant quackery."* He is evidently utterly and wilfully ignorant of the brilliant cures by hand-treatment, which occur without the aid of the regular physician; and his assertion that two years' training is necessary is in ludicrous contrast to his own statement of what massage is, — viz. 1. "*Effleurage*, — a stroking movement with the palm of the hand, passing with various degrees of force over the surface centripetally. It is of little value in itself, but produces good results when combined in various ways with other procedures."

2. "Next comes *pétrissage*, which is more important." "It consists essentially in picking up a portion of muscle or other tissue with both hands, or the fingers of one hand, and subjecting it to firm pressure, rolling it at the same time between the fingers and the subjacent tissues. The hands must move simultaneously and in opposite directions. The thumb and fingers are wide apart, and the whole muscle is taken up between the fingers and firmly pressed and rolled. The

* "A Manual of Treatment by Massage and Methodical Muscular Exercise, by Joseph Schreiber, M.D. [member of many societies omitted]. Translated by Walter Mendelson, M.D., of New York. Philadelphia: Lea Brothers & Co., 1887."

movement is made from below upwards, and the parts are squeezed in much the same way that one would squeeze out the contents of a sausage. Prof. Von Mosengeil always impresses on his pupils the necessity for 'working upstairs,' that is, from the extremities towards the centre of the body. The skin must move with the hands, or the operation is a painful one for the patient. What one hand misses the other takes up, so that all the tissues are subjected to the influence. It is of importance to proceed uniformly and not to jump from spot to spot."

3. "The next process is *friction* or *massage à frictions* which is performed with the tips of the fingers, and is employed chiefly in the treatment of affections of the joints. It has nothing to do with what we ordinarily understand by friction. It is always associated with *effleurage*, and it must be performed quickly and with considerable facility or it is well-nigh useless.

"*Tapotement* is a kind of percussion which may be made with the tips of the fingers, their palmar aspects, the palms of the hands, the back of the half-closed hand, the ulnar or radial border of the hand, or with the hand flexed, so as to contain, when brought into contact with the surface of the body, a cushion of air."

In all this there is nothing that could not be imparted to an intelligent person in an hour. To demand two years' instruction for these simple operations is a piece of pompous assumption, and the whole statement aims at nothing but mechanical movement of the fluids, and shows a profound ignorance of the true principles and philosophy of manual treatment. In fact, most of the treatises on massage that I have seen seem to be a matter of technical pedantry, showing an utter ignorance of the best effects of manual treatment, the rapid relief of pain, the increase of vitality and the transfer of curative energy from the operator, — in comparison with which the multiplied insignificant petty details of modes of manipulation appear as childish as pedantic. One of our most sensible writers on massage, Rossbach, expresses his contempt for "all those ingenious inventions of trivial subdivisions," and Schreiber says: "Every one who has devoted any time to mechano-therapy will gladly subscribe to Rossbach's sentiments."

It must have been pedantic trivialities indeed which disgusted Schreiber and Rossbach: for Schreiber himself indulges habitually in the most trivial details, as if instructing a dull ignoramus. He begins his instruction thus: "Pressure may be performed in a variety of ways: one, two or three fingers being used, according to the size of the part to be treated and the force which it is intended to use. *The participation of the little finger is only apparent*: for, being two

centimetres shorter than the ring finger, it cannot touch the part to be manipulated simultaneously with the others; its feebleness, too, would render it at least of little use. The index finger, to be sure, is also shorter than the middle finger, but only by one centimetre, and it therefore more readily adapts itself to the middle and ring fingers;" and so on *ad infinitum*,— all illustrated by numerous engravings to show the pressing, tapping, thrusting, hacking, pinching, squeezing, rubbing, stroking, etc., etc., and at the end of his work, the bibliography refers to 187 works on this subject. Alas, we may say that, with one twentieth of all this industry, guided by original and rational thinking, we might have had splendid results.

Very few lessons are necessary to show an intelligent person how to disperse pain and inflammation by nervauric passes and gentle manipulation, or to invigorate the languid circulation and enfeebled vitality of organs. In all of these processes the vitality imparted by the hand of the operator is vastly more important than the mechanical effects of pressure and motion. Under the best conditions of operation the most beneficent and brilliant effects are produced without any contact. Dr. Schreiber, a much more intelligent author, maintains that a person of good understanding can acquire massage by himself if he studies the physiological effects, while mere imitations of methods of procedure will never lead to success. He thinks therefore that every physician should be ready to practise massage, especially as "the mechanical treatment of acute muscular rheumatism or of a recent neuralgia *takes decidedly less time than any other method;* for, while many days and even weeks are often consumed trying all sorts of medicines, a cure might have been effected in these cases by mechanical means at a single sitting." This is very true as to the results; but it is not mechano-therapy which is so prompt, — it is the vital influence which is smuggled in under that name. The hand accomplishes what a block of leather-covered wood cannot, and this every intelligent friend of massage knows. Dr. Schreiber distinctly states it thus: "Many devices have been invented for saving the manipulator's strength, such as Klemm's muscle-beater, the elastic rods with rubber balls of Graham, and the machines run by steam of Zander. All these are well enough in their way for treating certain phases of disease, but in general they may be said to be wholly inadequate to our needs, and are quite apt to degenerate into mere playthings." The hand, he says, "surpasses the best of instruments, and the skilled operator needs no other aid, no matter what kind of manipulations he may wish to perform."

But, in their ignorance of vital laws, physicians endeavor to believe that the superiority of the hand in massage is due to mechanical

reasons, and with equal blindness they think the superiority of the hand as an electrode is due to its mechanical structure.

The processes recommended by Dr. Murrell as massage are far inferior in effect to those of barbarous races — the *lomi-lomi* of the Sandwich Islanders —which, as Nordhoff says, relieves all soreness and weariness, and produces a healthful, refreshing sleep. The untaught skill and vital sympathy of these people is vastly superior to the technical stupidities of European massage. The *toogi-toogi* and *fota* of the natives of the Island of Tonga are stated to produce the same pleasant effects as the Sandwich *lomi-lomi*. In fact, a sympathetic benevolent temperament in the operator, acting in accordance with benevolent common-sense or intuition, is far superior to the mechanical processes dictated by the dogmatism which is superciliously blind to the whole nature of the processes of healing and their vital philosophy.

To relieve the suffering by kind manipulations is the instinctive impulse of benevolence, and has been practised by all nations. Chinese manuscripts near five thousand years ago contained directions for manual treatment, and I do not believe that the profuse literature of massage of the last twenty-five years has made any very important advance beyond the knowledge of the old barbarians. What I have read on the subject has been in some cases so uniformly and pedantically stupid, that I have not felt that I could afford to spend much time on such literature.

The delightful effects of manipulation in baths have been described by many writers in glowing colors. Nordhoff, describing the *lomi-lomi*, says : " To you thereupon comes a stout native with soft, fleshy hands, but a strong grip, and, beginning with your head and working down slowly over the whole body, seizes and squeezes with a quite peculiar art every tired muscle, working and kneading with indefatigable patience, until in half an hour, whereas you were weary and worn out, you find yourself fresh,— all soreness and weariness absolutely gone, and mind and body soothed to a healthy and refreshing sleep." This, according to Murrell, has nothing in common with massage. So much the worse for the latter, if it is eclipsed by the methods of barbarian races !

Schreiber, too, confesses as follows, that massage is an unpleasant affair in comparison with Egyptian baths : —

" Savary in his letters from Egypt, in describing a bath taken by him there, speaks of the delightful feelings produced by passing through a series of apartments of graded temperatures, of being surrounded by scented vapors, of having his body scoured, pressed and kneaded, and his limbs stretched and his joints cracked, of being enveloped in clean linen, laid upon a soft couch, and having all parts

of his body dried by the tender hands of children. When finally he mentions the coffee and tobacco which contribute to the pleasure of the massage; when he breaks forth in hymns of praise on the delicious feeling of sensuous ease produced by massage; when he speaks of the ease with which the blood seems to circulate, of the feeling of refreshment that ensues, and of the sweet sensations and delightful ideas that arise in the mind; and when finally he allows himself to declare that in fancy one overlooks the whole world, which seems to be at one's feet, and to grow more bright and refulgent under the observer's eye, and that everywhere only the laughing face of fortune is seen, — all I can say is, that unfortunately mechano-therapy has nothing in common with these beautiful impressions and delightful sensations. It usually *causes a good deal of pain*, and it is only in the popular acceptation of the term that the patient 'sees stars.' After his daily manipulation the patient *generally feels exhausted*, often *experiencing pain for twenty minutes or half an hour*, which gradually disappears. The time for the repetition of his treatment is anticipated with *fear and trembling*, and only the conviction of its efficacy, or the fact that the cure has already begun and is visibly progressing, gives him courage and endurance to *stand the torture imposed*. In certain diseases, as constipation, neurasthenia and choera, it is true there is no pain, or none worth mentioning, connected with the cure; in other cases, however, the patients *cry out aloud, shed tears and even vigorously resist the physician*, with arms and legs, — a proceeding which must not, however, be considered as sufficient ground on which to base a charge of assault and battery."

Is this benevolent and skilful treatment? Is the painful nature of a process or the disgusting character of a medicine any proof of its superior merit? Have the magnetic healers any such confessions to make? On the contrary, it is the charming and prompt relief they give which has enabled them to overcome the consolidated mass of prejudice nourished by pedantic colleges, flourishing in the universal ignorance of psychic science and the higher departments of biology, and enforced by the jealous animosity of their medical competitors.

That massage processes mechanically assist the circulation as efficiently as active exercise is quite apparent, and that improvement of local and general health should follow even if the operator had no superior endowments is obvious enough, and has been verified by careful experiments in massage. The investigators however, fail to see that there is any cause but the mechanical. They have shown that when a muscle has been exhausted of contractility by Faradic currents, a few minutes' massage restores its contractility, and Zabludowski has proven this also upon the muscles of a frog. The vigor of

muscles which have not been exhausted is increased by massage, surpassing in this respect the effect of electric currents, and hence pugilists in training undergo considerable rubbing; and rubbing has been extensively associated with bathing, as an invigorating luxury. Mankind for ages have extensively used this natural treatment while it has been neglected by the profession.

In many cases in which electricity has failed to be of any value, massage is a most efficient agent, but the writers are not aware of the great value of the touch or mere contact independent of mechanical action. Those who understand the vital influence and know how to give it have not acquired such knowledge from the colleges, and are therefore jealously denounced as charlatans for performing cures where the faculty have failed. Dr. S. Weir Mitchell of Philadelphia says: "It is many years since I first saw in this city general massage used by a charlatan in a case of progressive paralysis. The temporary results he obtained were so remarkable that I began soon after to employ it in locomotor ataxy, in which it sometimes proved of signal value, as in other forms of spinal and local disease." If Dr. Mitchell should become acquainted with Therapeutic Sarcognomy he would make a still greater gain.

That massage of the abdomen should be beneficial, as claimed in constipation and dyspepsia, is reasonable, as such manipulations accord with Sarcognomy; but in treatment guided by Sarcognomy the abdominal surface does not absorb all attention while the spinal region, the source of its power, is neglected.

The annals of what is called Magnetic Treatment are full of the most marvellous cures of rheumatism, neuralgia and every variety of acute and of lingering diseases, which sometimes vanish in a few hours or a few minutes. All this experience has been contemptuously ignored by the old colleges, even when coming from such distinguished physicians as Dr. Elliotson and Dr. Esdaile, because it was not in their curriculum, and they have brought forward in opposition their mechanical ideas of massage in which they unconsciously enjoy the benefit of vital forces and sympathies, and thus take to themselves more credit than mechanical action deserves. The persons whom they employ for massage are sometimes skilled in animal magnetism and accomplish much more than is expected; but if they perform any marvellous cures they must conceal them from the faculty or be punished for their temerity. A patient in a Boston hospital, suffering from pneumonia with a very high temperature, fell under the care of an intelligent attendant who had attended a course of my lectures. Benevolence prompted him to do what he could, and he gave great relief, lowering the temperature remarkably. The next morning the

physician was astonished and commented on the case emphatically to his pupils as presenting a most marvellous, unprecedented change, for which he could not account. The guilty healer was wise enough to conceal his agency.

Dr. Wm. Balfour of Edinburgh, in 1816, published "Observations with Cases illustrative of a New and Simple and Expeditious Mode of curing Rheumatism and Sprains without in the least debilitating the System:" which was really a very good treatise on what is now called Massage, but was neglected for half a century by the profession. One of his cases is worth mentioning, though less remarkable than many contemporary cures made outside of professional ranks. It is the case of a French lady of Edinburgh, Madame Rey De La Ruaz, a hereditary sufferer from gout from her childhood. When first seen by Dr. Balfour, he says: "All her fingers were extremely weak, some of them swelled, others so exquisitely painful that she could not suffer them to be touched; she could not lift a wine-glass with one hand, but she contrived to do it with both, by turning their backs to each other. Both wrist-joints were stiff and painful, but the left could not be moved without the greatest suffering. Both elbow-joints were greatly affected; the left did not possess half the natural range of flexion and extension. On each humerus above the inner condyle, a large tumor was situated, so painful that it could not be touched without making the patient cry out. All the muscles covering the humeri were, from origin to insertion, rigid, knotted, thickened. The deltoid muscle felt like two boards; the connections of the clavicles with the shoulders, and the joints at their flexures, the patient could not suffer to be touched; she could not lift her hand to her head. . . . . Her head and a small part of the anterior portion of the trunk of her body were indeed the only parts free from disease, and she had not walked a step for eight years."

Dr. Balfour restored her to health in five months by his processes of compression, percussion and friction, without using any medicine but a few laxative pills and "a saline julep when she was feverish." In his enthusiasm he said: "I congratulate all mankind that a cure is at last discovered for one of the most harassing and painful diseases to which human nature is liable,—a disease in its nature so obstinate as to have hitherto set at defiance the utmost efforts of the healing art." But Balfour's cures received no more attention than those of the magnetic healers; yet now, after seventy years, rheumatism, neuralgia, neurasthenia, hypochondria, hysteria, anæsthesia, hyperæsthesia, chorea, palsy, sprains, glandular enlargements, stiff joints, diseases of the eye, cerebral congestion, hemorrhoids, chlorosis, mellituria, metritis, dyspepsia, constipation, phthisis and some

forms of poisoning are claimed to be "suited to mechano-therapy" by Dr. Schreiber. Murrell claims for it immense value in spinal irritations, in relaxed corpulence, in anæmia, in convalescence generally, and in certain stages of syphilis, especially in women who have been much reduced by the disease. In sciatica, Max Schuller of Berlin claims its superiority over all agents commonly employed, making cures in less than three weeks. Its great value in diseases of the joints has been illustrated by Prof. Von Mosengeil and others, and was forcibly illustrated in a work published, as far back as 1825, by Surgeons Grosvenor and Cleobury of Oxford, England, which at that time attracted many patients.

After recommending massage for uterine diseases, Dr. Murrell concludes with a protest against any manual treatment not performed by an operator under the absolute control of a physician, ignoring entirely the fact that the most brilliant cures by manual treatment have been in cases in which physicians had nothing to do with the treatment, such as those of Greatrakes, published in 1666, which he has read without apparently learning anything from a treatment more remarkable in its results than anything he refers to. To his mechanical modes of thought, the operations of Greatrakes were a mystery.

GREATRAKES, a Protestant gentleman holding official positions in Ireland, began in 1662 to cure cases of scrofula, which he continued for three years; then began to cure agues, in which he was surprised at his own success, and afterward engaged in the treatment of all kinds of diseases, not only in Ireland, but in England, to which he was called by the Earl of Orrery. He simply placed his hands upon the patients, using prayer, and healed them rapidly, never receiving any compensation. Eminent persons of the nobility, divines, physicians and scientists attested his marvellous cures. The philosopher Robert Boyle, the astronomer Flamstead, bishops and mayors proclaimed his marvellous success. Among other instances, Dean Rust mentions that he had seen him cure "cases of scrofula which had for years set at defiance all the doctors; cancerous swellings in women's breasts; disperse lumps and hard tumors at once; heal ulcerous sores of long standing; cure deafness, lameness, dimness of sight; banish epilepsy; and cause scabs which covered the whole body, and which for many years had been counted incurable, to peel off and disappear, leaving the skin sound and healthy."

Nothing to compare with this has ever been reported of the mechano-therapy called Massage. Yet the colleges have never investigated these unquestionable facts or brought them before their pupils, who have been kept in profound ignorance of what the colleges did not understand and could not teach because they proscribed it.

Anthropology clears up the mystery of marvellous cures by explaining the power of the vital nervaura and the psychic elements which medical scientists have ignored, — psychic faculties which in their full development surpass all other curative agencies.

How different has been the spirit of the colleges generally from that of the most eminent physician of his day, F. Hoffmann, medical professor for 48 years at the end of the 17th and beginning of the 18th century, who said in his "System of Rational Medicine": "An imponderable but material agent, æther (the active moving force), animates all tissues of the body and presides over physical phenomena in every domain of creation. . . . The living organism exercises the functions peculiar to itself in consequence of qualities inherent in all animal matter, which qualities are animated by a motive force emanating in the form of a certain peculiar material which is secreted by the brain and carried into the body, and is under the regulation of a complicated organic apparatus. This æther is the fundamental cause of all vital motion." This æther he regarded as the soul presiding over organic life and determining man's whole existence, and he further said: "Medicine will never progress until we closely examine the nature of this form of motion *originating in the sentient soul*, and until we apply to medicine the laws of mechanics and hydraulics."

But what college or what scientific author has ever attempted to investigate these basic forces of life coming from the brain? The only important effort in that direction is found in the much-neglected writings of Reichenbach. To attempt such an investigation has been to forfeit the sympathy and respect of the medical profession. The colleges defend their ignorance far more zealously than their knowledge, which instead of upholding they discredit. More than a score of the most eminent physicians and surgeons have denounced the therapeutics of the colleges in language so extravagant as to be slanderous, while at the same time the ignorance of the colleges is vigorously and almost unanimously upheld by denunciation and ridicule of those who present them important discoveries and unquestionable cures. The leaders of the profession have been pessimistic and faithless alike in what they teach and what they ignore.*

So vigorously have they resisted the approaches of electricity and of animal magnetism that even simple mechano-therapy or massage has fallen under the ban of prejudice in France (according to

* Among these may be named Sir Astley Cooper; Dr. James Johnson, editor of the leading "Medical Review of England;" Dr. Forbes, editor of the "British and Foreign and Quarterly;" Majendie; Rush; and twenty others of the highest rank.

Schreiber) because it bears a *resemblance to animal magnetism*, against which they have warred so long. Its recent introduction under the name of hypnotism has *carefully excluded all its therapeutic uses* except by suggestion.

The Faculty will not forgive Gassner, Greatrakes, Geo. Fox, Mesmer and his followers, Madame St. Armour, Newton and the Zouave Jacob, and many others, for showing that without the aid of medical science more wonderful cures can be made than all that colleges have accomplished, by using a power which they have ignored.

The most striking effect of massage or mechano-therapy is the promotion of absorption and assistance of the circulation by stroking in the direction of the veins and lymphatics. Health is greatly benefited by this removal of effete matter, absorption of effusion or deposits, and increase of circulation and consequent nutrition, warmth and vital energy. This cannot be done by the hand without at the same time imparting vitality by the nervaura. It requires no experiments to demonstrate such effects; but it is interesting to know that Von Mosengeil injected a hypodermic syringe full of India ink four times into the leg of a rabbit during eleven hours, and by systematic manipulation so completely removed it that none was found in the lymphatic vessels or glands. In this respect rubbing bears some resemblance to pneumatic treatment, but does not draw in so large a supply of blood.

The fact that while fluid materials are thus removed there is also a removal of pain and irritation more prompt than the removal of substance and not dependent upon pressure is of course ignored by mechano-therapists. Mechanical effects alone are thought of and mechanical procedures described in a way to tax the memory; the massage too is combined with an equally pedantic movement-cure, of which Schreiber judiciously says: "Several authors have published bulky volumes on 'kinesipathy,' 'kinesiatrics,' 'cinesiologie,' which, notwithstanding their merits, have through size and prolixity deterred the busy practitioner from consulting them. In works on the Swedish movement-cure we encounter a most absurdly difficult and complicated nomenclature, often quite sufficient to deter the average physician from ever attempting to engage in this line of practice. . . . . It is my firm conviction that the general practitioner will be able to employ this or any other form of mechano-therapy with the best results, without a previous knowledge of even one of the jaw-breaking terms applied to many of the procedures used."

As for the apparatus of mechano-therapy, Schreiber says: "A skilful operator can with his hands perform everything for which another

will need apparatus," but that the resistance-movements of the Swedish system can be better realized by apparatus than without it.

The Swedish movement-cure of Ling is a system of exercises, pedantically described, for the development of muscles, of which the translator of Schreiber says: "The Anglo-Saxon mind is happily unable to conceive the absurdities of Ling's nomenclature," and the English language is not "adapted for the expression of its terms."

Dubois-Reymond says of Ling's writings on his movement-system: "His arbitrary constructions, his empty-sounding symbolism, his meaningless schematizations and pedantic terminology no doubt impose on such semi-educated minds which, unable to detect the nonsense, accept a few scraps of anatomy and physiology as evidences of profound learning. Nothing whatever in Ling's writings indicates a truly physiologically conceived explanation of the underlying facts." He also compares the work of Rothstein, a pupil of Ling, to "a great, flowing, full-bottomed wig of a thousand ambrosial curls, placed upon a puppet's empty head."

Schreiber says that the pompous claims made for the "Swedish gymnastics to be a universal remedy deserve the severest castigation;" nevertheless he gives Ling great credit for directing the attention of physicians to gymnastics. "Ling's gymnastics," he says, "have an even greater and more certain effect upon innervation and nutrition than the common form of gymnastic exercises."

Surely it needed no ultra-enthusiast to enable the intelligent to understand that muscular exercise increases muscular strength, increases respiration, circulation, absorption, digestion and appetite; diminishes fat and abnormal products, increases the energy of the entire constitution and develops the particular muscles that are used. What special effects this may have is shown by Sarcognomy. It shows that vital stamina and health are promoted mainly by shoulder exercise, and vital force by exercise of the thighs.

For the effects of all habits and exercises we need only look to the map of Sarcognomy. It teaches us that whatever increases the action of the diaphragm, increases the animal energies; but whatever increases the upward expansion of the chest ennobles the moral nature and establishes a firmer health.

Active exertion generally, as it proceeds from the shoulders, back and thighs, develops force of character, and by muscular compression diminishes abdominal fulness, — thus overcoming the indolent, sensitive and morbid elements.

The truth which mechano-therapists neglect is, — that physical power comes from nervous more than from the muscular system, and that consequently no exercise produces the best effect unless asso-

ciated with pleasure or earnest interest that may call out the stronger faculties of the brain. Mere muscle-culture is not a culture of health, as has been proved by athletes of all sorts, prize-fighters, rowers, runners, lifters, etc., some of whom shorten their lives ; and it was proved by Ling himself, who died of consumption.

Mechano-therapists not only take these narrow views of Physiology, but degrade the matter still farther into the prevalent chemico-mechanical theory of vital processes. Even Schreiber says of the muscles : "Each fibre may be supposed to contain a substance ready to undergo combustion under the influence of a nerve impulse : *that the heat so produced is in part used for the production of work*," etc. This is the purely imaginary theory of the schools. Heat never produced muscular force, but always counteracts or diminishes it when beyond the normal standard.

Schreiber, from the careful study of the results of experience, ascribes great value to "mechano-therapy, *vulgo* massage," in neuralgia and muscular rheumatism, in the absence of inflammation, which contra-indicates such treatment. In this it is decidedly inferior to the nervauric or psycho-manual treatment, the practitioners of which never regard inflammation as an obstacle, but treat it as something to be controlled.

For severe sciaticas, Schreiber prescribes a course of exercise for the muscles around the hip joint, accompanied by manual treatment sometimes severe enough to produce ecchymosis from hacking and kneading the muscles of thighs and buttocks, and gives the details of such treatment for 32 days. It is *six to twelve days before any amelioration is realized.* The whole course is painful and laborious, and the cures (which he claims are sure) require from *ten days to eight weeks.* His reported cases demonstrate the cures in various lengths of treatment, but do not show how much is pue to the passive and active exercises, and how much to the vigorous handling of the parts.

He claims, however, that lumbago and stiff neck may be cured in fifteen minutes, and that "all recent neuralgias are equally curable," if vigorous treatment is used, disregarding the patient's cries and resistance. "It should be our object to affect the muscles in their very deepest parts (always carefully regarding the bones), to stretch and concuss the nerves, and to cause an evolution of heat and to stimulate the circulation in the tissues involved." In all this his mind is concentrated upon the mechanical forces without a thought of the vital influences which often effect prompt cures without the use of any mechanical force ; and he acts on the theory that "neuralgia in general is to be cured by stretching the affected nerve."

His manipulation is rational, beginning with gentle processes with the fingers and proceeding to firm pressure.

In all human progress it seems to be necessary to have men of one idea neglecting everything else to develop the value of any method and call public attention to it by their fanatical zeal.

Hacking the muscles, which is a favorite measure, is intended to penetrate the deep-lying parts by its force and is done by striking with the side of the hand, from the wrist to the end of the little finger, with considerable force, which sometimes produces ecchymosis. He describes in detail three weeks of daily treatment by exercises and manipulation for cervico-brachial neuralgia. He describes a patient cured by four weeks of treatment, who, whenever any symptoms returned, could cure himself by going through the prescribed exercises.

But though neuralgias of nerves associated with muscles yield to such treatment, he confesses that his treatment of nerves "between the skin and an underlying bone" is inefficient; trigeminal neuralgia was especially intractable. Hence his conclusion that "it is in the muscles that the true field of mechano-therapy lies." These cases, however, which he finds entirely intractable are not so to those who understand vital treatment. On the contrary, in the impressible temperament they yield most readily to manual treatment. But he seems not to have observed the vast differences of constitutions in the degree of obstinacy and intractability of their diseases. It is to be understood, too, that all diseases produce by their continuance organic tissue changes which destroy the recuperative power and thus in time make them incurable unless the nervous system has preserved its controlling power. He has also failed to understand the effects of different directions of gentle manipulation and stroking, and attached altogether too much importance to mechanical force exerted in a painful manner. The cases in which his very painful manipulations wrought cures might have been cured as well or better without inflicting any pain. He treated his colleague for spinal neuralgia in so violent and painful a manner that "he made a most lively resistance." All American experience, I believe, shows the impropriety of such painful operations.

The value of mechanical treatment where the muscles are concerned is illustrated by the well known value of muscular exercise in conquering rheumatism. Men who feel utterly helpless may be frightened by a fire or by the guns of the enemy into sudden exertion and running, to the destruction of their rheumatism. Schreiber refers to a case reported by Busch in which a country doctor attacked with "intense muscular pain in all parts of his body" was advised by an

old peasant to mount his horse, and being lifted to the saddle by several men rode off in great suffering. A thunder-storm made him ride at full speed, and he arrived at home in great perspiration entirely relieved.

The co-existence of fever does not, according to Schreiber, contra-indicate the use of mechano-therapy which conquers such cases of myalgia and neuralgia in from 12 to 36 hours, with beneficial effects on the associate fever.

"In both anæsthesia and hyperæsthesia (he says) the areas involved must be pressed, kneaded, pinched, and finally mildly hacked. Even where the trouble depends on some central disease, much good may still be obtained, as was shown by a case reported by me elsewhere." "Turck was the first to show that anæsthesia of a mild degree could be removed by the use of friction alone," — a truth, however, long known among magnetizers.

In arthritic neurosis involving the knee and hip, which generally depends on a neurotic condition, no anatomical change has been found where the severity of pain has caused amputation to be used. Such suffering is rather accompanied by lack of circulation than by any hyperæmic state. Anæmia is often productive of neuralgia; and "sudden embolism of the large arteries," says Billroth, "produces severe pain in the parts below the obstruction." He reports successes in such cases, but says that "a large amount of moral influence must be added to the mechanical treatment." He uses gentle manipulations, increasing their force, using passive and active motions of the limb and the corresponding members. But it is self-evident that all such measures are vastly inferior to pneumatic treatment, which produces a full circulation.

In palsies amenable to treatment,— that is, *paresis*, — Schreiber recognizes mechano-therapy, electricity and hydro-therapy as the available measures, conjoined with passive and active movements of the limbs. Alas, half a century of successful demonstration of the power of pneumatic treatment seems not to have interested the medical profession. Schreiber makes no reference to it, and the fashionable authors are silent.

In opium, morphine and chloral poisoning, he says, "we possess no readier or more efficient means than the mechanical, whether applied in the shape of beating, pinching or hacking of the muscles, over the whole body, or of repeated strokes on the palms and soles. We read of cases where these procedures have been kept up for many minutes and even for hours, resulting, in the end, in the resuscitation of the poisoned individual."

Death occurs speedily in chloroform poisoning unless prompt

relief is given, but in the poisoning of morphine and of carbonic acid gas there is much less danger. Mechano-therapy in these cases he considers much more valuable than electricity, ammonia and sinapisms. A young woman who seemed dying from the hypodermic injection of from a third to a half a grain of morphine was revived by severe flagellation with rods on the palms and soles of the feet. She sat up in bed and the flagellation being suspended the coma returned, but being flagellated again for an hour, she recovered and without any ecchymosis from the severe beating. Sarcognomy shows that the feet are the most efficient antagonists of the brain and consequently the best location for directing excitement from the head.

The same immunity from the effects of beating was observed in the case of a Mr. Wright Harris, reported by Dr. Barrett of Middletown, Conn., over sixty years ago, who had taken an ounce and a half of laudanum for suicide and was revived by switching the palms and soles with willow switches. After he woke and objected to the treatment he fell back into coma and had to be switched into consciousness several hours. It was eight hours before this treatment ended, but no ecchymoses were produced, which shows that insensibility prevents inflammatory irritation and congestion. There could be no better evidence of the value of anodynes in therapeutics.

The merit of the treatment was not so much in the pain as in its location, which was most appropriate as an antagonist to cerebral oppression.

"Dr. Bullar of Southampton claims to have saved every case in which there was suspension of respiration following chloroform narcosis, by himself and his assistants vigorously slapping the patient's body with the palms of their hands. This was kept up until pulse and respiration were again perceptible, which sometimes did not happen until as much as ten minutes had elapsed. In many cases the application proved to have been so vigorous that the lower extremities particularly were covered with ecchymoses. Bullar insists that no time should be lost in trying electricity and other useless measures, but that the mechanical treatment should be at once resorted to with full confidence as to its efficacy. He states that in several of his cases the action of the heart and lungs had ceased completely and beyond a doubt, but that by mechanical treatment life was once more recalled."

This is a more efficient treatment than the switching, because it covers a larger surface and brings into play the vital forces of the operators. Such measures should also be used in cases of drowning. Physicians who are governed by the dominant materialism of the colleges keep themselves utterly blind to the transmission of vital

force in the treatment of disease. Occasionally a physician has liberality of mind enough to break away from scholastic dogmatism, like Dr. A. Mueller of Victoria, Australia, who, in the "Australasian Medical Journal" (March, '89), speaking of this transferable vital force, as shown in a case in which the victim of deadly snake-bite was cured by a fakir, says: —

"To the next question that suggests itself, whether there is at the disposal of these fakirs or of any human being a force or power capable of rousing the torpid nerve-cells into action, a decidedly affirmative answer may be given. So-called 'exact' science has until very lately ignored the existence of this force, and I should not have ventured to mention it even in your columns if modern psychological research, both in Europe and America, had not at last enforced a tardy recognition of its existence, thus opening up vast fields of research hitherto not dreamt of in our materialistic philosophy. Thousands of years before our Christian era, it was known to our Aryan ancestors under the Sanskrit name of *akasa*, or the life-principle, — the life-giving fluid or medium; and early in this century Baron von Reichenbach demonstrated its existence by a series of most interesting experiments. In a room from which the faintest ray of light had been excluded, his sensitives or clairvoyants described it as issuing from the tips of his fingers and from his eyes in the form of bluish or yellowish flame-like emanations, and as enveloping his body in a cloud or aura of the same color. These emanations were further described as differing both in color and intensity with different individuals introduced into the room. Von Reichenbach also ascertained from these sensitives that emanations similar in appearance were issuing constantly from magnets he presented before them; hence the name of vital or animal magnetism has been given to this force, although Reichenbach himself proposed to call it 'Od,' a name occurring in ancient books of the Kabala. To this force, which numberless experiments have proven to be communicable without contact, the recovery in the case of snake-bite cited by Dr. Reid must be ascribed. [Such snake-bites were invariably fatal.] In paralysis not resulting from organic disease and structural change of the nerve-tissue, it is now, under the name of massage, a recognized and effective remedial agent; but this coarse method of employing it is typical of the imperfect and merely rudimentary knowledge we possess of its vast potencies that will, no doubt, cause it hereafter to become one of the most powerful means of alleviating and curing disease in the hands of the skilful physician when he has become a true healer." *

* That vitality is actually transferred from the operator to his patient, to the great

The switching plan was successfully tried in the case of Dr. De Angelo, near Venice, who was poisoned by a dose supposed to contain strychnine. Nausea, vomiting, delirium, epileptic convvlsions, unconsciousness and suspension of heart and lungs made death imminent. After trying "friction, strong sinapisms, douching with cold water, as well as the external and subcutaneous application of strong ammonia water," in vain, the four persons in attendance procured switches from a tree and switched the palms and soles, producing restoration in about half an hour, the first signs of movement appearing after fifteen minutes.

The success of flagellation administered several hours after chloral poisoning was reported by Dr. Meyer in the "Chicago Medical Journal" for November, 1876. But the speediest relief in chloroform poisoning is by the circulation, — restoring the blood to the brain by position, — placing the patient with his head downwards, or lifting him by the feet and legs. Junod found this the quickest method when his pneumatic treatment produced fainting, — raising the lower limbs higher than the head.

Sprains, according to Schreiber, should be treated (if there is no serious laceration) by centripetal rubbing followed by a flannel bandage and exercise when the pain is relieved. A suitable position and apparatus are also necessary. "According to Phillippeaux, recent slight sprains are nearly always curable at a single sitting, and even in severer cases (provided, of course, there is no fracture) four to five sittings suffice to put the patient on his feet again. The sooner the treatment is begun the quicker will be the cure." "All authorities agree on one thing, and that is that the time consumed in treating a sprain mechanically is far less than by the old method

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benefit of the latter and loss of the former, is very familiar to all who engage in manual practice. Dr. M. of Washington City who attended my lectures, recently related his own experience as follows : He was called to attend Mrs. M. L. apparently in the last stage of consumption contracted from her husband who had died of it. Physicians said that her lungs were gone and beyond hope. She had been lying speechless and unconscious for two weeks, taking no food at all and looking like an emaciated corpse. He went by urgent request, expecting only to soothe her dying moments. He placed his hands on the front and back of her chest for fifteen minutes and felt that his vital force suddenly went out to the patient. In about five minutes consciousness returned, and she opened her eyes and spoke to him by his name. He was so exhausted and oppressed that she perceived it and told him to discontinue his efforts as it was too much for him to bear. He feebly stepped to the bowl, bathed his forehead and returned in a state of great debility to his home, where he was kindly received, bathed and put to bed, rested twenty-four hours and was restored.

The patient immediately called for food and ate heartily. She rose from the bed and sat up for a longer period each succeeding day, until, at the end of two weeks, she called on the doctor, expressing her unlimited gratitude and readiness to go to work. She waited two weeks longer by his advice, then engaged in active business, married and bore six healthy children, and continued in good health. Could there be a better illustration of the sudden and complete trausfer of a great amount of vitality?

of immobilization and cold applications," which is a very absurd treatment, and requires, on an average (according to statistics), over 25 days, while 9 days were sufficient by massage. It is remarkable that nothing is said of treatment by hot water, which is always beneficial.

Dr. Hueter makes a *naïve* confession, saying: "If, as often happens, the natural bone-setters *meet with more success* in the treatment of joint-troubles than regular practitioners, it is simply because the latter are *ignorant of the rational means* for curing these cases,"—which is self-evidently true! Their cold-water treatment is a good illustration.

Schreiber, in directing upward manipulation for sprains, admits that the direction is not important in neuralgia and myalgia, which is a virtual confession that the cure in such cases is not mechanical.

Glandular swellings have been successfully treated by manipulation; as indeed all deposits, accumulations or swellings may be thus mechanically relieved, as well as helped by the vital force employed. Schreiber, Bergham and Nichaus report success in this treatment of mastitis, the inflammation or swelling of the breast.

Swelled tonsils are treated in the same way, as well as hypertrophy of the parotid and submaxillary glands, though with less certainty in the latter. "Ruinart directs that the finger previously dipped in powdered alum be pressed against the tonsils from the inside, at first gently and then with considerable force. This treatment is followed by an emollient gargle. The whole procedure is so simple that the patient can readily perform it upon himself after a few trials.

Even diseases and engorgements of the womb have been treated with considerable success by mechano-therapy — two fingers being inserted in its cavity while the other hand is applied externally, pressure and motion being gradually increased. It is claimed that adhesions have thus been broken up. We have the testimony on this subject of Cazeau, Norstrom, Asp (who treated 72 cases, embracing "chronic metritis, ulceration, ovaritis, chronic catarrhal troubles, perimetritis and displacements of various kinds), and A. R. Jackson of Chicago. In some cases the treatment is external.

Œdema of the lower limbs is treated by upward manipulation Ovarian cysts and other abdominal tumors have been treated by abdominal manipulation with benefit. The fluids thus moved are discharged in the urine.

"In manipulating the œdematous abdominal walls (says Schreiber) the motions should be made from above and outward, in a direction downward and inward, toward the inguinal region, for

the lymphatics of the anterior and lateral portions of the skin of the abdomen empty into the plexus of lymph nodes lying within the pelvis and upon the internal iliac muscle. This plexus empties its contents into the superior lumbar nodes, and these again into the thoracic duct."

For stiff joints, massage with movement is recommended as a very slow process, sometimes unsuccessful, and liable, if hurried too vigorously, to produce inflammation.

For the eye. — "According to the unanimous opinion of the most eminent oculists, the application of mechano-therapy is suited to the following diseases of the eye: 1, conjunctivitis pustulosa; 2, conjunctivitis marginalis; 3, episcleritis, subacute and chronic; 4, all varieties of corneal opacities capable of being cleared, as those following pannus, and scrofulous and parenchymatous keratitis." "The rubbing should not last longer than from one to five minutes, nor should it be performed oftener than once daily, except in such cases where rapidity of cure is specially called for." "The best results of ocular massage are obtained in cases of long-standing corneal opacities." "Pagenstecher asserts to have seen good results in old, long-standing cases, and records cures of opacities that had lasted for thirty years or more. He always uses an ointment of yellow oxide of mercury," but others practise without any ointment. "Latterly the mechanical treatment of glaucoma has been advocated."

"Klein was the first to attempt the mechanical treatment of keratitis in its acute stage, and in one instance he succeeded in abating the inflammation after three days' treatment in a case in which the other eye, similarly affected, had required six weeks' treatment by the old methods." Of course treatment of the eyes would be *far more successful* among those who understand vital science. Dr. Mack of Boston and London has been very successful in the treatment of the eyes in cases in which the medical profession had failed.

In "chlorosis, chronic catarrhal gastritis, pulmonary phthisis, hysteria, hypochondria and diabetes mellitus," Schreiber says, "*the uselessness of all medication* in these diseases has long been recognized," — a remark which shows the limited character of his own knowledge of therapeutics, and the generally skeptical character of the profession. Nevertheless he may be a competent witness as to the effects of mechanical therapy. He says that in neurasthenia, hysteria and hypochondria "sometimes a great deal may be accomplished, in others very little." Yet in such cases magnetic healers produce wonderful results, especially in hysteria, which promptly yields to treatment. His confession of the failure of mechano-

therapy is instructive, showing, as it does, the effects of professional ignorance in relying entirely on mechanical force. What he says upon the treatment of these cases is hardly worth mentioning.

When we compare with the results of mechano-therapy or massage those of the vital treatment, in which the nervauric influence is the chief reliance, the contrast is as great as in passing from a desert to a tropical garden. We leave the slow, dull labors and the dreary delays and frequent failures, to find, in many cases, a restoration of health so speedy and surprising as sometimes to excite a suspicion that, after all, a disease so easily conquered was not as formidable as it seemed. The difficulty in many cases is to induce the members of a profession of which so many are stultified in their education by the dogmatic ignorance of the colleges to admit the possibility of marvellous cures when not witnessed by themselves.

When the impressible temperament exists in the patient, and the operator, with high vitality, is guided by correct principles and psychometric intuition, the cures are so marvellous and speedy as to be really miraculous, in the proper sense of the word *miracle*, which means not as Hume defined it a violation of the laws of nature, which is of course an impossibility, but a very wonderful thing, transcending common experience.

Having given so much space to the claims of massage, I think it necessary to state the results that may be expected from truly scientific treatment, and therefore introduce a few statements from my pupils, before presenting which I would mention that manipulation of morbid parts, if not controlled by the mechanical massage theories which attribute everything to physical force, will not fail, with intelligent and humane persons, to make many cures and give great relief by the vital power which inevitably operates when it has the opportunity.

An excellent illustration is afforded by sprains, in the treatment of which the supercilious prejudices of the profession have had very disastrous effects. The superiority of manipulation over all other measures in the treatment of sprains, though generally neglected by physicians, was well established by experience among the French. A work on manipulation published at Paris in 1863 saos: "Indeed, according to the opinion of MM. Bagin, Bonnet, Brulet, Elleaume, Girard, Labataud, Magne, Mery, Quesnoy and Ribes, who have recently published their observations upon sprains cured by manipulation, these affections should be treated from the commencement by this procedure. The pain, ecchymosis and swelling disappear as if by enchantment." "As M. Bizet says in his monograph upon the treatment of recent sprains by manipulation, impressed by M. Baudin's remark at the

Academy of Sciences that in 78 amputations of the leg or foot performed by army surgeons *sixty arose from sprains* as their starting point, we ought to seize with eagerness each opportunity to try a means which will give an unlooked-for success." "The cure by manipulation (says M. Bizet) is more prompt and certain in proportion as the remedy follows, so to speak, upon the accident." "Of all means which are recommended for sprains, manipulation is the simplest, the easiest in application and the most efficacious, *for it cures a simple sprain at the first sitting*, and seldom is its frequent repetition necessary."

"Pouteau had already recognized this when he said: "Sprains may be instantaneously cured by this means (manipulation), and I cannot understand why our surgeons ordinarily are unsuccessful with this little procedure, which they give up to uneducated persons."

"At the present day those physicians who have it in their power to bring this method into use are unwilling even to make a trial of it, or to do as much as those of Pouteau's time." "But we ought not," as M. Nelaton says, "systematically to reject a useful means *because it has been discovered and employed by men who are unskilled in medical art.*" In this remark Nelaton alludes to a crime against humanity which would not be so common in the profession if it had any proper teaching of medical ethics. The professional warfare against vital treatment and psychic diagnosis, refusing to give them attention or justice, with the most calamitous results to patients, is one of the crimes concerning which we may well say: "Father, forgive them, — they know not what they do." How vastly superior is treatment which brings the vitality of the operator (sometimes a marvellous power indeed) into contact with the patient.

Dr. H. Frank at a recent meeting of German Scientists claimed that for the revival of the apparently dead there were two efficient means, — electricity and manual concussion. His method was vigorous strokes with the hands on the ileo-cæcal region in an upward direction, which affects the respiration and the heart. After fifteen or twenty such strokes, he strikes over the heart repeatedly with the palm of his hand. He keeps up such operations for an hour or more even after resuscitation and claims the recovery of life in fourteen cases — hanging, drowning and carbonic-oxide asphyxia, — and in one case of croup. One of the cases was of apparent death by chloroform. Aside from vital influence there is no doubt of the manipulations which force up the diaphragm and thus imitate respiration.

All methods of treatment have value which bring a vigorous and benevolent operator into contact with the patient. Vigorous exercises, in which the operator holds the patient's hands while they struggle against each other, have been used with much benefit.

Among the Japanese manipulation is performed by a class of operators called ammas. "His art (says W. J. Holland) consists in kneading all the muscles of the body and bringing them into play, and he is regarded as a useful functionary, second only in importance to the physician as a healer of physical disorders. The art is practised not only by men, but also by women, and at almost every inn where I have stopped among the first persons to proffer their services have been the ammas.

"In the operation of shampooing, as practised by the amma, the patient lies upon a futon, or rug, while the amma kneels beside him. The first act in the drama deals with the abdominal cavity. Placing the hand on either side of the abdomen, above the hips, the amma compresses the body laterally a number of times; then drawing up the loose folds of the flesh, he kneads and pinches them, at the same time making passes which correspond in their direction with that of the colon. This portion of the treatment ended, each leg is attacked and vigorously rubbed and kneaded, the process terminating by a smart bastinado administered to the soles of the feet.

"In rubbing and kneading the muscles use is made of a round ball of box-wood. The arms and chest are treated as the legs, and then the patient is turned over, face downward, and the shoulders and back are punched and kneaded until the breath almost forsakes the body. The entire performance ends with a vigorous rubbing of the neck, which, in my case, seemed to threaten the dislocation of the cervical vertebræ. The amount of strength in fingers and wrists displayed by the amma is quite remarkable."

In this rude operation the benefit lies in forcing the circulation of manipulated parts, and in receiving the vital influence of the operator.

In conclusion, what is the sum total of the mechano-therapy which has filled so large a space in professional literature and practice?

1. Mechanical pressure on the course of the bloodvessels and lymphatics promotes circulation and nutrition, and causes absorption of effusions, deposits and morbid growths.

This being nearly self-evident to any good phsyiologist, it may well be asked what has mechano-therapy added to our knowledge? Its most distinct contribution is in showing the applicability of manual pressure to the tonsils and the womb, and to diseases of the eye. Its mechanical value, however, is indefinite, for in all cases it is associated with the vital influence.

2. Active manipulation of muscles with active and passive movements are found to be efficient in the cure of neuralgia and rheumatism when there is no inflammation present. Dr. Schreiber deserves credit for showing the success of long-continued movements and

forcible manipulations in such cases. Still they are not as efficient as active movements performed under strong mental excitement. The painful severity of this treatment might have been entirely overcome by medical electricity.

3. The importance of flagellation and blows in cases of narcotic poisoning and drowning has been fully shown.

The sum total of mechano-therapy as a contribution to therapeutics and the range of its power is scarcely equal to that of any one leading drug. It is incomparably inferior to that of electricity and adds very little to the vast range of therapeutic power which belongs to the vital treatment guided by Sarcognomy.

Moreover as a blind, unscientific treatment it is often injurious from its inappropriateness and from the coarse, uncongenial influence of the person employed as a rubber. Hence Dr. Landon Gray said at the Academy of Medicine (New York, October, 1888) that "massage was an uncertain remedy, often irritating to the patient, and was only to be used in connection with the treatment mentioned."

CHAPTER XVIII.

RATIONAL PRACTICE GUIDED BY SARCOGNOMY.

The proper philosophic view of medical science, sects and prejudices — False ideas of poisons — Rational practice — Statements of Dr. Grosvenor Swan, Dr. J. P. Chamberlin, Dr. Wm. E. Wheelock, Dr. A. J. Symes, Dr. Z. L. Baldwin, Dr. Orrin Robertson and L. A. Hulse, Esq., concerning their practice, guided by Sarcognomy and Psychometry.

The introduction of a true therapeutic revolution should be guided, not by a destructive and intolerant iconoclasm, but by the genial conservatism which holds on to all the knowledge already attained, gives due credit to the pioneers of science (whose incomplete discoveries the multitude are blindly following), and harmoniously blends the old with the new.

Far be it from the writer to discredit the vast attainments, the elaborate research, the minute knowledge, the pathological and physiological accumulations and triumphant achievements of the medical profession during the last three centuries, which are preserved in medical literature (and much more imperfectly in medical colleges), because the profession generally, with the inherited instincts of warlike, barbarian ages (which it will require centuries to overcome), has been, and still is, gregariously devoted to authority and jealous against innovation and progress: still more lamentably it has been devoted to professional dignity, reputation and pedantic learning, instead of looking solely to curative means and measures, from whatever source they come.

The champions of medical orthodoxy might justly speak with eloquence of the progress of anatomy, surgery and pathology; but when they look for therapeutic results, the confession must be made that comparatively little effort has been made to discover the innumerable agencies in which nature offers an antidote for every possible disease, — a negligence which induced Prof. Stillé of Philadelphia to confess in his "Materia Medica" that: "Truly, nearly every medicine has become a popular remedy before being adopted or even tried by physicians." Another author on the materia medica, Dr. Pereira, says, "Nux vomica is one of the few remedies the discovery of which is not the effect of mere chance."

The last twenty years have done something to remove this opprobrium, especially through the action of druggists whose mercantile enterprise has placed them in the front rank of progress. But still a profound and sullen lethargy exists in reference to the experience and discoveries of American physicians (classed as Eclectic) and the wonderful experience of the followers of Hahnemann.

Narrow and dogmatic minds think there must be an irreconcilable antagonism between the contributions of Hahnemann and all prior therapeutic knowledge, requiring us, if we recognize the one, to treat the other with absolute contempt. Even many Homœopaths share in the bigotry and intolerance of their rivals. This incompatibility is entirely imaginary, and there is no reason why an enlightened physician, educated in either school, should not avail himself of the resources of both, with the eclectic liberality which demands that he should neglect no agency that can help his patient and disregard no experience of his intelligent brethren.

Is it not obvious or self-evident that, if a remedy acts upon any organ stimulating or rousing its action for the time being, the same remedy used in excess or continued too long will overpower and destroy the organ which in judicious use it helps? as cold, which, moderately administered, by a cold bath briefly given, or by a cold atmosphere, is a powerful and grateful tonic, but, in excess, overpowers all the functions of life, producing torpor and death.

I believe there is no important exception to this law that the primary physiological effect of any remedy corresponds to its ultimate pathogenetic effect, operating on the same organ, building up health in one case and creating disease in the other. Hence there is no reason why we should not be equally instructed by the old-fashioned, simple method of observing the beneficial primary effects of a moderate dose of any remedy, and the Hahnemannian method of seeking its destructive or pathogenetic effects, — the two evidently coinciding, and both being necessary to a perfect understanding and a practical guidance. I hope, therefore, that every reader of this volume will utterly ignore and discredit the old and stupid Homœopathic and Allopathic contention and quarrel.

I may suggest to both parties that the old method of studying the materia medica (so absurdly christened Allopathic) is just as rational as the new method, and consequently that it is not *indispensable* to study every remedy in its pathogenesis alone (a tedious and disagreeable method), for the speedy and delightful method of Psychometry enables us in a few minutes to ascertain the character of any remedy as truly as by tracing its pathogenesis; and, consequently, if time permits, I may be able to give the world a PSYCHOMETRIC

MATERIA MEDICA, which will be far more accurate and comprehensive than the results of the old-fashioned clinical experience, though it may not overwhelm us with the bewildering details of pathogenesis and the contradictory results of clinical experience.

Meantime I would urge every physician to cultivate his own psychometric capacity, and study the materia medica by experiments on himself, if possible; but if, unfortunately, his psychometric power is limited, he may investigate through the numerous natural psychometers who may be found in any community. When by the psychometric method he obtains a sympathetic perception of the condition of his patient, the same psychometric perception will enable him to trace the relation between the pathological condition and the remedy. He may hold the remedy with one hand, and the patient with the other, and recognize their adaptation. This is RATIONAL PRACTICE, for it is eminently successful.

The unfortunate narrowness of the human mind, and the ignorant credulity of many, which yields to the dictation of bigotry, are the source of the contentious dogmatism at present. The larger class look exclusively to drugs administered with very little scientific accuracy and a deplorable limitation in number, — not one-tenth of what every physician ought to know, — while minorities adhere to the exclusive use of infinitesimal preparations, the exclusive use of water, the exclusive use of vegetable remedies, the exclusive use of what they are pleased to call non-poisonous or hygienic agents, the exclusive use of mental influence, or the exclusive use of animal magnetism, all of which are valuable in their places, but the exclusive use of any one of these shows a lack of knowledge and lack of the disposition to investigate candidly; and the gentleman who recommended the use of nothing but Brandreth's pills was but another example of the prevailing narrowness of mind.

The prejudice against drugs as poisons results from a superficial mode of thought, influenced by the gross or poisonous use of medicines by narrow-minded or reckless physicians. Those who have fallen into this prejudice do not understand the action of medicine and the meaning of poison. The poison of their imagination does not exist in nature, for there is no distinct line of separation between food, medicine and poison. The same substance may be at once a food, a medicine or a poison, according to the method of its use. A food nourishes or sustains the body, a medicine makes a modifying impression on the vital functions, and a poison makes an impression so forcible as to be injurious. Salt as commonly used is a necessary food, more freely used it becomes a medicine, and in large quantity a poison. Coffee and tea are medical foods, which may be concen-

trated until a moderate dose becomes poisonous, — as in caffeine and theine. Acids generally are medical foods, which become poisons in excess. Alkalies though necessary elements of our foods would be poisonous if used in large quantities. Oats though a good example of food contain elements which separately used are medicines or poisons according to the dose given. Lettuce though recognized as a food contains a valuable medicine. Vanilla, nutmeg and the peppers used as foods are actively medical. Dandelion, a common food, contains a valuable medicine; so does asparagus; and I am quite sure as valuable a medicine might be obtained from the turnip tops which are used similarly. All foods modify vital action in some degree and thus have a medical character, so that a profound study of dietetics would enable us to substitute foods very largely for medicines. Buttermilk is a good food, but its lactic acid is medical; and peach leaves, which yield a decoction sometimes used harmlessly in domestic practice, contain prussic acid, one of the most powerful poisons known. Thus all foods are medical in various degrees, and a few are poisons if freely used; while a few medicines — such as phosphates, iron, maltine and cod-liver oil — are decidedly foods.

But whenever any substance by concentration becomes unsafe to use in doses above a few grains it is called poison, to signify the danger of using it. But how small a fatal or very injurious dose should be to deserve the name of poison no one can say, for the word poison is more an epithet of abhorrence than a scientific term. Whatever is medicinal may be used in a poisonous dose, and a few of our foods are active enough to become poisons in large doses. The word poison, therefore, simply means an article of great power which needs to be handled carefully. There is no such thing as a distinct class of poisons as vulgarly understood, — a class of substances inimical to life, which have no other effect, even in small quantity, than to injure or poison. There is no substance in nature which may not be beneficial to man, rightly applied, or which is dangerous in an infinitesimal preparation, unless it be the morbid elements from the animal body in a state of disease. Yet even these, which come nearer to the definition of a poison, are shown by Homœopathic research to be capable of a beneficial use. The word poison, therefore, does not define any class of bodies, but means something which under the circumstances and mode of application is extremely injurious to a human being. Hence no judicious application of any medicine whatever can be properly called a poison, no matter how potent it may be. The venom of the rattlesnake, in an infinitesimal preparation called Lachesis, may be used as a valuable medicine. And the highly corrosive poison, muriatic acid, may be used in sufficient dilu-

tion as a medicinal food; and, indeed, combined with the corrosive caustic soda, it becomes a necessary food, — common salt. These remarks are necessary to counteract the tendency of those who become acquainted with nervauric therapeutics to neglect and discard medicines, the cheapest and most convenient of all therapeutic measures. As well might we reject everything but bread from our daily food.

My pupils are instructed not only to use their own vital power and electric currents guided by Sarcognomy, but to study remedies carefully and use them as required, both medical and mechanical, under the guidance of Psychometry. Their practice in accordance with my directions is, therefore, the true type of the RATIONAL PRACTICE of the future. That they are very successful in doing this — curing cases abandoned as incurable under the old practice — is shown by their letters and statements, a few of which I here introduce, not as examples of perfect therapeutics, but as illustrations of what may be realized by all well qualified students of Therapeutic Sarcognomy. In the following statements the full names of the patients were given, and they are at the service of any who wish to inquire, but I have preferred to follow the usual custom, giving only the initials, except in the report of Dr. Swan.

Many of the cures performed by my students are of the class called marvellous, and generally considered incredible; but similar cures by thousands have been made by those who have by accident or intuition followed the laws of Sarcognomy. It is nearly a century since an American physician, Dr. T. Gale of the State of New York, with a rude electrical instrument, was led by his benevolent spirit into the extensive application of electricity in all varieties of diseases. He followed the promptings of benevolent common-sense, and in doing so closely approximated the principles of Sarcognomy. His results, published in a small volume in 1802 at Troy, far surpassed those of any medical practice then known, and in fact were far beyond the electro-therapeutic practice of to-day. But his book produced no impression on the dogmatism of the colleges. To me it was deeply interesting as a demonstration, a century in advance, of the truth of much that I am teaching. He proved by his practice that static electricity, applied according to correct principles, approximated the character of a panacea, conquering fevers, inflammations and the entire range of diseases met in common practice, curing every case in epidemics of the most malignant character.

STATEMENT OF DR. GROSVENOR SWAN OF HARTFORD, CONN., A GRADUATE OF 1849.

At the time of his graduation I taught Dr. Swan to exercise his psychometric powers, but it was not until after he had established a

solid professional reputation in medicine, surgery and obstetrics that he was induced to try his personal powers in healing, in which he has had very remarkable success.

The following cases, stated at my request, are fair examples of his practice: —

"Since you have so kindly urged me to give you some of my most remarkable cases, in which I have been aided by my knowledge of your Science of Sarcognomy, I give you — with some degree of reluctance, I must confess — the following. I have hesitated only for the reason that the cases are so wonderful, I fear that they may too seriously challenge the belief of the reader.

"I do not send you any affidavits, or certificates of 'remarkable cures,' for if I should you might conclude that I may have reasons for thinking that my own veracity might not be accepted as sufficient authority in the case of such extraordinary facts as I am about to communicate.

"For my success in the cases that I shall now relate to you, I cannot say how much I am indebted to my knowledge of your Science of *Therapeutic Sarcognomy*, nor how much to what you were once pleased to term my '*personal potency*.' I can only say that in all these cases I have not failed to assert my confidence in the science, by applying its principles. Not with the thought and feeling of an investigator, but the feeling that it was my duty to make use of all the means within my knowledge by which I might hope to restore my patient."

First Case: Hon. Thurlow Weed. — "In the spring of 1872 I was called to see the Hon. Thurlow Weed, who then resided on 12th Street in New York City. I found that he had been suffering for about four years from a paralysis that rendered him incapable of raising his chin from his chest. He had been to Europe in search of relief, but he had failed to obtain any benefit from the best medical skill that he was there able to find, and he returned to his home, fully believing that during the rest of his life he was doomed to go about *looking downward*. From the time of my first treatment Mr. Weed was enabled to look up and rejoice.

"When I was first called to Mr. Weed he was sick in bed and could only rest in one position. He was soon relieved, so that he could rest in any position, and in two or three days his tall figure was again seen on the streets. Mr. Weed was cured and I returned to Chicago.

"Soon after this Mr. Weed made a visit to Albany, where he had spent his best years in the most active struggles of his life. While on this visit he met Frederick Seward, who was greatly surprised at

his appearance, and after learning all the particulars he returned to Auburn, N. Y., and informed his father, Ex-Gov. W. H. Seward. This information induced his father to send for me to see what I might be able to do in his case. He not only dictated a letter himself, but had his physician write. When these letters reached me I was in Madison, Wis., where I had been called by Prof. Carpenter, a teacher in the Law Department of the Madison University."

Hon. W. H. Seward. — "I immediately responded to Mr. Seward's message, and when I arrived at his home I found him almost entirely helpless. He could not get out of his chair without assistance, and he had no more use of his arms than he could have had if they had been whittled out of wood and tied to his shoulders with strings. Here was a good opportunity for applying the principles of Sarcognomy.

"In the first treatment I enabled him to rise from his chair unassisted, and walk wherever he might choose, about the premises. After one more treatment I put life and action into his left arm, so that he was able to feed himself with it. I remained with Mr. Seward for two weeks; his general health was improved, but I did not better the paralysis much after a few of my first treatments.

"From Auburn I came to New York, where I remained until the 1st of October, '72; and I then came to this city, and have made Hartford my home ever since."

Samuel Rogers. — "Soon after I came here a young man was brought to me from Utica, N. Y., by the name of Rogers. (Well-known in Utica, by the name of Sam Rogers.) He was suffering from paraplegia. When sitting in a chair he could not raise a foot from the floor, nor could he scarcely move a toe. One evening I invited in, to see my patient, a couple of gentlemen who were supposed to possess rather strong magnetic powers, and I had them try the effect of their treatment in this case. They failed to produce the least perceptible effect. It then came my turn to see what I could do. Instead of treating the limbs below the knees I gave my attention to the region of *Muscularity*, and treated along the line of *Locomotion*. The result was that he was instantly able to raise his feet from the floor. The people present thought that it was owing to the superior power of my magnetism, but I endeavored to explain to them that it might be, in a great measure, owing to my knowledge of a Science of which, I think, they had not then heard. Mr. Rogers had, in a few weeks, the use of his limbs restored to him, and it is not long since I heard of him as being engaged in editing and publishing a newspaper in some town in the western part of the State of New York."

Tumors: Mrs. Barnes. — "About this time I was called on by a Mrs. Loren W. Barnes, who was suffering from a well-defined scirrhous tumor, located in the left breast. She informed me that her physicians pronounced it cancerous, and that she had been under treatment for it for the past six months. She was perfectly cured, without medicine or any local application except my hands, in less than six weeks' time. She is now living at No. 18 Florence Street, in this city, and she has never had any trouble from it since.

"Another remarkable case which occurred sometime after this was that of Miss Cora Parkhurst, No. 50 Summer Street, this city. She had been under treatment for about a year for an encysted tumor with a bony shell, which was attached to left side of the inferior maxillary, and near the root of the first molar, which I think had been extracted. I was two or three months in treating this case, during which time the ossific matter of the shell was completely absorbed, and the tumor entirely disappeared. This tumor was near the size of a hen's egg, and, as I was informed, was increasing rapidly in size at the time that I commenced treating it. In this case no medicine was given, and no external application was made use of except my hands. There is not a vestige of the tumor left, so that it would be impossible to tell which side of the face it had occupied by the most careful examination.

"It has been said that there is 'nothing new under the sun;' so in these cases *you* must know that I am giving you nothing new, for in 1666 there was a man in London by the name of Greatrakes, who, according to the published Transactions of the Royal Society of London, when Sir Robert Boyle was president, cured cancers and tumors in the same way."

Case of Mrs. Griffin of Granby, Conn. — "Some time in the month of July or August, in 1876 or '77, I was called into the town of Granby to see a Mrs. Griffin (I cannot give you the exact date, as I took no note of the case at the time), who had been prostrated, I think, with what the doctors called *childbed fever.* When I saw her she had been under the care of the doctor in town, and of a consulting physician, who had been brought from Granville, Mass., for about six weeks. For the past week she had not been expected to live from one day to another. Her physicians had declared her case hopeless. Her husband and friends were in despair. She had heard of me at some time, and feebly expressed the wish that I should be sent for, and with all possible despatch I was sent for. The messenger was the father of the young man, the husband of the sick woman. He said that he had not come for me expecting that I could cure her, as it was now past the time when anything could be

done, and he did not think it at all likely that she would be living when we should get there. The husband, he told me, had no more hopes than he had, but he felt that he could not endure the thought, when she was gone, that he had not done everything in his power to gratify her in her last dying wish.

"When I reached the place I found that several of the neighboring women had assembled, expecting, no doubt, that they would soon have to do for her and the family what our undertakers under such circumstances do for us here in the city.

"When I was taken into the room where she lay (the square room of an old fashioned farm-house), she was perfectly helpless and appeared almost lifeless. She could not move her head on her pillow, and her husband had to move her into position so that I could get my hand to the upper dorsal region. I then stimulated the region of *muscular power*, and worked along the line of *Locomotion*. I soon discovered that I was producing some effect upon her. I then requested the husband (who was perfectly exhausted through his long and continued watching) to retire to another room, and to send in a lady whom I noticed, and described, as sitting in a corner of the room that I passed through when I came in where the sick woman lay. I then took my seat on the opposite side of the room from where my patient lay, and I requested the lady sent to me to take a seat on the same side of the room and not far from where I sat. (This lady was an entire stranger to me, and I had never before seen a person that was there.) I then said to my patient that if a feeling of strength should come to her, and she should feel that she could do so, she might raise herself up in bed. I can hardly imagine why such an announcement by me could be considered as anything but a mockery (as reasonably it would seem) of a poor dying woman. In less than three minutes she rose up in bed ; I then said, 'Put your feet out on the floor.' She did so, and I proposed having some stockings put on her feet; but as the weather was very warm, and the floor was carpeted, she thought that she did not need them. I then said to her, 'Stand up on your feet,' and she immediately stood up. I then requested her to come to me, and she walked from her bed across the room to me and after remaining for a few moments I told her that she might return to her bed. She walked back and jumped into bed with the sprightliness of a little girl.

"I then sent for Mr. Griffin, and had him come to the hall door. I did not admit him into the room, for I dare not risk my patient under the influence of his exhausted and negative condition. When Mr. Griffin came to the hall door I said to him, 'Perhaps it would be a gratification to you to know that your wife is so far restored that she

can get off from that bed and walk across this room?' He exclaimed in great astonishment, 'My wife has not borne a pound's weight on her feet in the last six weeks.' I then turned to her and said, 'He evidently does not believe that you can walk, will you show him that you can?' She arose from her bed and came to the door, and I introduced her to her husband, saying that I thought that she would hereafter get along without the aid of doctors. The last that I heard of her was that she is well, and able to attend to all her domestic duties."

Mrs. O. D. Seymour. — "On the 13th of April, 1881 (I can give you dates now), I was summoned to the bedside of the wife of O. D. Seymour. Mrs. Seymour had been for several years an invalid, and for the last two or three years almost entirely helpless, and for the last year or two unable to be bolstered up so as to enjoy a sitting position in her bed. The moment such a thing was attempted, she would be taken with nervous rigors (she called them chills), and would have to assume at once a horizontal position in her bed. I made my usual examination, following down carefully the spinal column to see if I could detect any tenderness along the interosseous spaces, but all the while keeping one hand applied to the upper part of the dorsal region. I also gave proper attention to the region of *Muscularity*. After this examination I took my seat on the opposite side of the room, and in less than ten minutes she arose from her bed, without any apparent assistance, and walked across the room to where I was sitting. I then assisted her back to her bed, and she has been able to walk from that day to this."

Mrs. F. L. Burr. — "On the 26th of July, 1881, I received a message from Mr. F. L. Burr of the 'Hartford Daily Times,' requesting me to return to Hartford on the first train.

"I found Mrs. Burr to be in what the physician that was called in my absence considered a *critical situation*.

"She had been taken with a violent attack of cholera morbus. She also had a chronic difficulty of the heart, and it seemed as though in her prostration there must be complete heart failure. I quieted the stomach with medicinal remedies, and I restored the heart's action through my personal potency, applied according to the rules of Sarcognomy. After she had revived sufficiently to begin to realize her situation, which was a few days after I was called, she thought that her lower extremities had been paralyzed, as she had not the strength to move them. I assured her that as soon as we could get her stomach in a condition to admit of her taking a little more nourishment I should be able to satisfy her that her limbs were all right.

"A few mornings after this I told her that I was ready to convince her that she had not lost the use of her limbs, and in less than ten minutes she was enabled to rise from her bed and walk to where I was sitting in a chair, a distance of several feet from the foot of her bed; and I may say that I have not known of any time since that she has not been able to walk."

Mrs. Thomas. — "In February, 1874, I was called from Hartford to Chicago to see the wife of Gen. H. H. Thomas, who had been under the care of the first physicians in Chicago, including, I believe, Prof. Byford of the Rush Medical College. The foundation of her sickness was a uterine trouble, that her physicians seemed to have no power or skill to relieve her of. She had become so prostrated that her head could not be raised from her pillow by placing the hands under her shoulders and raising her body up in her bed; her head would fall back on her pillow. If you attempted to raise her up in bed you would have to put one hand under her head to support that.

"The third day after I was called to her she walked with me on the street the distance of a block."

Mrs. Holmes. — "After my return to Hartford, in the month of May, I was called to Gouverneur, St. Lawrence County, N. Y., where I had formerly practised, to see the wife of Charles P. Holmes, who had been given up by her physicians and was not expected to live from one day to another. She had been confined to her bed for six weeks with typhoid fever. The message from Mr. Holmes, and which I promptly obeyed, was, 'Take the first train and come: wife not expected to live.' In three days the friends became satisfied that she was out of danger, and I returned to Hartford.

"This is what Mr. Holmes says, in a letter that he wrote me after my return: —

"'I do not believe in miracles. . . . . It is owing to our ignorance of the working of natural laws, that govern and control all things, that causes us to call things enshrouded in mystery a miracle. Did I believe in miracles I should say that this snatching my wife from the very jaws of death was a miracle of the highest order. You can scarcely imagine the change that we have experienced. A little over a week ago we were standing around what we then thought to be the dying bed of my wife, thinking that she could not survive but a few hours at most. Her physician had given her up, and so had all of our friends. Now she is sitting up and recovering rapidly her lost strength.'

"Mrs. Holmes is living to-day, at Gouverneur."

Mrs. Foster (of Rossie, St. Lawrence County, N. Y.). — "In the winter of '84 and '85 I was in Gouverneur, St. Lawrence County,

N. Y., and as remarkable a case as ever yet went on record, in almost any period of the world's history, was that of a Mrs. Foster, at that time living in the town of Rossie, and a patient of Dr. G. E. Baldwin of Gouverneur. She had been prostrated with severe sickness, and had been under the care of several distinguished physicians, who had failed to benefit her and had given up the case as incurable. The friends, as a last resort, wished to try the effect of the homœopathic treatment and Dr. Baldwin was reluctantly induced to give the case a trial, and he soon became convinced that there had not been vitality enough left in her system to respond to his remedies. As there were differences of opinion, and considerable doubt as to the cause of her sickness, Dr. B. took me on the morning of February 1st to see his patient, being anxious to know what my opinion might be. We went by cars, and arrived at the house early in the morning. The house was a sad one when we arrived. We were told that she was still alive, and that was about all that could be said. When I was admitted to the bedside of the sick woman she appeared to be in a semi-comatose state, and seemed too far gone to recognize any one. Twelve days after this Dr. Baldwin wrote up the facts in this case with the intention of having them published in one of the papers in Gouverneur, but I induced him to let me have his letter to send to the 'Hartford Daily Times,' which I did, and Mr. Burr published it. I will here give you the concluding remarks of Dr. B.'s letter: 'As Dr. Swan approached the bed of the sick woman I stepped out of the room, after which the doctor requested all but the husband to leave the room. Not knowing this, within five or six minutes I returned, when to my surprise I saw my patient, who but a few moments before was thought to be dying, out of her bed and walking, without any apparent assistance, to the doctor, who was seated in a chair several feet from the foot of the bed. She stood for a few moments, and then the doctor arose and took her by the hand and walked back with her and placed her in her bed. The husband was all this time sitting in a remote corner of the room. How such a thing could be accomplished by any mortal means is a mystery to me. In an earlier period of the world's history it would be called a miracle. What shall we call it now? I know that there is not the least exaggeration in this statement, and yet I confess that I could not have believed it, had I not seen it, if told me by my dearest friend. Instead of the patient being exhausted by the effort she appeared to rally, and after a refreshing sleep she called for refreshments.'

"I would say that my success in manual healing I attributed, in a great measure, to my knowledge of your system of Sarcognomy."

Mrs. Ward. — "When in Albany, a few years ago, I was called to see the wife of Deacon John Ward, whom I found suffering the most excruciating agony from what is known as dysmenorrhœa.

"She had been to Philadelphia, and had been subjected to a very serious surgical operation, but with no relief; she had also been under treatment by the most celebrated New York physicians, but had not been able to obtain the least relief from them, or anything that she had ever tried. Her agony was indescribable: no suffering that I had ever witnessed in the most fearful cases of parturition that I had ever known in an extensive practice could be considered as any comparison to it; and she would always be confined to her bed for two weeks as the result of this sickness. No opiates, not even morphine or chloroform, appeared to have the least effect in relieving the pain.

"In less than ten minutes after I laid my hands on her she was perfectly easy, and she has had no return of the suffering to this day.

"In four weeks from that time I was in Rochester, and Mr. Ward brought his wife up there, and she remained during her period at the Osborn House, where I was stopping at the time; but she had no symptom of the trouble with which she had been afflicted all her life, never before having passed that period without suffering pains that had so prostrated her that she was confined to her bed for the subsequent two weeks. According to my best information she has never had anything of the kind since. I could give you several cases of a similar character, but one is as good as more.

"I have not deemed it necessary to ask permission of any of the parties above named, to publish the facts describing the surprising results that have occurred in my treatment. I have not considered myself under any particular obligation to do so. They are truths to which the world is entitled, and since you have kindly requested me to furnish you with them, you are at liberty to make such use of them as you may think proper, for the interest of your readers and the benefit of humanity.

"G. SWAN, M.D."

CASES REPORTED BY DR. J. P. CHAMBERLIN, PRESIDENT OF BUCHANAN ANTHROPOLOGICAL SOCIETY, BOSTON.

In reply to your inquiries in the matter of my experience as to the advantages of Sarcognomy and the utility of Psychometry, I would say that it has been highly satisfactory to me, and my patients have been more than pleased with my success. Of the many hundreds of cases which I diagnosed and treated, I have not lost a single case;

nor has a death occurred save in two cases, and these were cases that had been treated (and in one case I believe maltreated) by the regulars and given up as hopeless. Although several cases had been pronounced by the regulars as incurable they are now in good health and attending to business. I also wish to add that in all my cases I have used the remedies recommended by you in the course of instruction given at the College of Therapeutics.

As you request me to give fuller details in relation to some cases of my experience in the practice of Therapeutic Sarcognomy, I may mention two in Buffalo, N.Y., out of the many successfully treated.

Miss H. G., Franklin Street (about twenty years of age).— I found her in a prostrated condition, having been in bed about ten days, and no sleep the last three days. She had high fever and feebleness of limbs. Acute burning pains along the spine and very sensitive to pressure along the spinal column. Tetanic contraction of muscles of neck and back, the head drawn backward, with suffocating sensations. The symptoms showed clearly a case of Spinal Meningitis.

Treatment. — I seated myself in a chair by the bedside for about two minutes, then with my right took her left hand, placed my left hand on the anterior side of the head, the heel of the hand covering the region of sensibility, then moved it slowly backward to the region of Health. I then applied my right hand to the region of vital force and immediately the contracted muscles of the neck began to relax. I moved her head forward, then moved my hand slowly downward to the third or fourth dorsal vertebræ, and all her pains ceased immediately. I said to her, "In the morning you may arise and dress as usual," — but as I looked she was asleep; she had not heard what I said to her. I then left the room and beckoned her parents out of the room and forbade any one entering the room again that night unless she awoke. She slept till about eight o'clock the next morning, or about ten hours continuously. When she awoke she arose and dressed herself, sat down to a good breakfast, then went about her daily work as usual. She was cured; I gave no medicine.

Mrs. D. S. — I was requested by a friend of theirs to call with him to see if anything could be done for her, as she was very sick. We were met at the door by the nurse and doctor and told that Mrs. S. was dying and no one could be admitted. We asked to see Mr. S. and were told that he was at the bedside of his wife, who was already unconscious, and they did not like to speak to nor disturb him. The door was about closing on us, when Mr. S. came forward and bade us come in. In deep grief he told us we were too late. I said to him, "Go to her and she will open her eyes; then tell her that I am in the house; then come to me and tell me just what she says or

does." He replied, "*It is too late*, but I will do as you desire," and as he approached her she opened her eyes and he said to her what I requested him to. She pointed to the door and said, "Come." He called me in, then retired himself, and I was alone with her and her doctor. As I approached her I placed my hand upon her cold, damp forehead. I took her by the hand, then placed the other on the region of vital force, holding it there for about two minutes, during which time I, too, was *watched* over by the "regular." Mrs. S. says, "How strange!" The doctor leaves the room, seeks Mr. S., and protests against *quackery* and the cruel and wicked treatment and the suffering I was inflicting upon the poor dying woman. And just what else occurred outside for the next five minutes I never knew, but I was not interfered with; I was doing my work, life was returning, her pain was ceasing, and she was thanking me with her whole soul as Mr. S. entered the room. I left Buffalo early next morning and returned the day following to hear of a "miracle" performed. I was told that Mrs. S. was a well woman, — I could not believe it. I called on her and found her in bed. In reply to my question she said she felt no pain; felt as well as ever, but weak. In a short time she fully recovered her strength and was regularly attending to her household affairs. I gave her no medicine.

Miss L. W., 11 Nassau Street, Boston (diagnosis, without questions, Bright's Disease inherited from father: was then told that her father had died of that disease). — The first two treatments consisted of dispersive passes on head from Disease to Health and stimulating from Health to Vital Force, then down the spinal column to the region of the kidneys, — then gave sulphate of soda and one grain phosphate of iron two or three times a day for one week, then changed medicine and gave lavender and hydrangea; also gave magnetic treatments once a week. Cured in ten weeks. No pain or distress in region of kidneys since. Cured two years ago.

G. A. C., North Abington (case of inflammation of liver). — Prostrated by pain and tenderness also fulness on the right side at margin of and little below the ribs, pain increased by pressure or deep breathing, unable to lie on left side, pains extending to right shoulder, feeling of heavy weight on liver.

Treatment. — Gave him a head, neck and shoulder treatment, then put very hot water over region of liver. I then left. An hour later he sent for me to come again; and as I entered his house, just two hours from the time I first entered it and found him in agony of pain, I now found him up and dressed, eating his broiled beefsteak. When he sent for me he wanted to know what he might eat, but as I delayed coming he said he feared he might starve before I would come

and so ordered his own meal. He was cured, and I scored one for *hot water.*

E. C. W. (case of nervous prostration and peritonitis). — Found him in a very critical condition; he had been sick six days, with some fever. Pain and extreme tenderness extending over the whole abdomen and increased by the slightest pressure. Abdomen hot and motionless. His countenance showed great suffering and anxiety. Face dark and shrunken, particularly so about the eyes and nose, cold and clammy. Also acute pain in the left side just above the stomach.

Treatment. — First on head, dispersed from Disease to Health, then stimulated Health and Vital Force, then downward to the back region of Health. Gave him a dose of lavender and scutellaria and continued magnetic treatment fifteen minutes to half an hour, then gave dose of salicylate of soda and bathed his bowels with same; I then applied hot water to the bowels, as hot as he could possibly bear it (on a towel), then proceeded at once to dry-cupping the left leg from hip to knee, then on calf of leg. I did this very thoroughly, continuing it for over an hour. I did this to draw the pain from the body. It worked like a charm so far as the body was concerned; all the pain left it and went to the leg. I left him fairly comfortable at 11 o'clock P.M., and marked him, —"one chance in four for recovery." The next morning found him better bodily, but his leg suffered severely; it was in a high state of inflammation and the slightest movement or touch was torturing. I applied salicylate of soda to leg and gave magnetic treatment to the whole body, frequently during the day, — gave him but very little medicine. This treatment was continued seven days, and his pains were gone and I pronounced him entirely out of danger. He recovered. One other very important factor which I must mention is, I had the assistance of one of the best magnetists I ever met — Jonathan Arnold of North Abington.

Mrs. A. O. W., the well-known clairvoyant and physician, Bryantville, Mass. (case of severe shock to nervous system occasioned by a fall). — I was accompanied by Mr. Jonathan Arnold of North Abington, who rendered most valuable assistance by his superior magnetic power. As we entered the sick-room it was so darkened we could not see where to go, and we were directed to the bedside where she lay. The least ray of light caused intense pain to her eyes. I placed my right hand over her eyes and two fingers of my left immediately back of her left ear, letting them remain for about five minutes, then gave the back of the right ear the same treatment. I then said, "Now let the curtains be raised so that the sun may come in." They were raised to their full height, and the full light of day streamed into the room, causing not the slightest pain to her eyes, though they were

quite red and inflamed. Her general appearance was somewhat startling. Below a line from nose to ear the face looked as though it had been in black dye, and appeared to be nearly paralyzed ; the whole body and limbs were badly bloated ; indeed, it seemed almost like trying to raise the dead to life, to attempt to restore her to health. Now I don't know whether we had faith or not. We went to work. Mr. Arnold placed his hands upon her feet ; my hands were upon her head. In a few minutes she said, " Oh, what a strange feeling ! " A peculiar sensation permeated her whole being, and then a profuse perspiration set in, great beads of sweat started from her forehead and over the face and body, and within ten minutes her entire clothing was as wet as though it had been dipped in a tub of water. Her pains were gone.

Three days later we found her in a comfortable condition, and almost her first words were, " Look at my head back of the ears ; you raised two great blisters there." I looked and sure enough a blister over one inch in width and more than two inches long had been raised behind each ear. Nothing had been applied to raise those blisters and nothing was on my fingers. Moreover I had just washed my hands in hot water immediately before I applied them to her. The question now comes, Whence those blisters ? I don't know. Who does ? Three days later we gave her another treatment similar to the previous one, and with like results ; her eyes, however, were well and needed no further treatment. She recovered rapidly from this time until entirely cured. I gave her but little medicine. After the fourth treatment she measured eight inches less around the waist than she did at the first time we called and the bloat of the limbs had greatly subsided.

These and similar cases lead me to more appreciate the great utility of Therapeutic Sarcognomy, for by following its simple teachings we make no mistakes, nor are we at a loss to know just where and how to apply treatments.

I will now name several persons who may be referred to, who no doubt would respond to letters of inquiry, all of whom were treated and cured in strict accordance with the laws of Sarcognomy.

Mrs. J. D., Brockton, Mass. — A case of peritonitis. Was very much emaciated. Supposed to be an incurable case by her physician. Gained strength the moment I entered the room, regained her health rapidly, and within three weeks was out of doors.

Mr. J. P. B., Boston. — A case of distended stomach, accompanied with convulsions. A case of long standing. Cured in two weeks (little medicine used).

Miss L. G. B., South Weymouth. — Severe case of neuralgia in face and head. Cured in three minutes.

Mrs. C. H. K., Findley, Ohio. — A case of chronic neuralgia. Cured in one minute.

Mrs. M. J., South Weymouth. — A case of chronic rheumatism. Cured in a few days (little medicine used).

Miss B. of Bath, Me. — Inflammation of nerves of eyes. A case of eight years' standing. Had been treated several weeks at the Boston Eye and Ear Infirmary without any benefit. Cured by one treatment.

I might give a large number of cases similar to the above, but these few cases show something of a range of diseases which yield readily under proper treatment as taught by you.

I may add that, with me, rheumatism and diseases of the nervous system yield more readily than most other diseases.

Yours truly,

J. P. CHAMBERLIN.

STATEMENT OF EBENEZER DAY.

BOSTON, Nov. 26, 1886.

While in California from 1850 to 1876 by hardships and exposure I contracted a complication of diseases from which I have since remained a confirmed invalid. I have suffered exceedingly from insomnia; for many years I have not slept during any twenty-four hours above five minutes altogether. Early this season rheumatic pains together with my old complaints completely prostrated me, and although the best medical attendance which money could command was summoned, their skill was without any good results, as I grew worse and worse and was given up as incurable. About the first of September I was rapidly sinking, all my friends present supposing I was already struck with death. My limbs had become cold and damp; I felt that my end had come. At this time, about 11 A.M., Mr. J. P. Chamberlin came with my attendant, who had told him of my case and asked him in to see me. He spoke to me several times and it was by the greatest effort that I could reply. He took me by the hand and asked my attendant to assist in raising me. I was raised to a sitting posture, when he applied his hand to the back of my head. Instantly the strangest sensation was experienced. I said to him, "What are you doing? You are knocking all the teeth out of my head," — though the sensation was not at all painful or unpleasant. But at once all my pains ceased and I felt life returning; a warm and peculiar thrill spread through my whole body, even to the ends of my fingers and toes. I was cured. He then ordered a good breakfast, of which I partook heartily. I felt well. I wanted to rise from my bed and dress myself, but was not allowed to attempt it then. The next

morning, however, I dressed myself without assistance. I regained my strength rapidly, and up to this time that glow of warmth which he imparted to me has not for one moment left me, although previous to his treatment I had not passed a day the past summer without suffering from being cold and chilly. I now sleep well; often five to six hours without once awaking. He gave me no medicine. By what means my life was saved I know not, but do know the fact. I cannot explain how I was cured, but am most profoundly thankful to Him from whom all blessings flow. EBENEZER DAY.

BOSTON, Sept. 10, 1887.

J. P. CHAMBERLIN :

My Dear Sir, — It is now one year since you imparted to me wonderful vitality by placing your hands upon my head, and raised me from an extremely low physical condition to comparative health. It was then a question whether the effect would be permanent. I am able to answer that question in the affirmative. Though I am not in perfect health now, and never expect to be again, yet that life power which I then received from you has not yet left me, and I daily feel its glow and strength, not only in body, but my mental faculties were never before as good as to-day. And I take this opportunity to again thank you for the great benefit you so kindly bestowed upon me.

Most gratefully yours,

EBENEZER DAY.

CASES REPORTED BY DR. WM. E. WHEELOCK OF BOSTON.

Case 1. — A young man of twenty came to our office at San Antonio very much emaciated ; was unable to get around very much ; said he had been troubled with chills and what the doctors called continued fever. This was November. During the summer he had spent four months in the hospital and received some benefit, but upon leaving there he had a relapse and was discouraged. Thinking there was no help for him, he came to our office seven times and we treated him according to the principles of Sarcognomy, but in addition to the nervauric treatments gave him three or four vapor baths. He never had a chill after the last treatment and within two months weighed 160 pounds and was to all appearance a perfectly healthy man.

Case 2. — A woman 40 years of age was diagnosed and treated by other physicians for dropsy. By placing the hand at one side of the abdomen and striking the other side with the ends of the fingers there was a sound and an action like water moving inwardly. I gave her a little medicine to regulate the system and nervauric treatments with electricity. I treated twice a week for a month and reduced her

in girth around the waist so that she had to take up her clothes in order to wear them. Her fears of dropsy were dispelled. Her means being limited she then stopped the treatments.

Case 3. — A German 50 years of age, a tailor by trade, had been unable to follow his occupation for three months, was broken of his rest at nights and in fact was a continual sufferer from rheumatism. One treatment not to exceed twenty-five minutes completely cured him. This was quite a remarkable case, as he had been treated by quite eminent M.D.'s with no benefit.

Case 4. — Weak eyes. A commission merchant 45 years of age had been unable to do any business for a number of years without spectacles, in fact wore them all the time. He had twenty-one treatments as taught in your classes for that trouble and he laid off his spectacles and can do his business without them. I saw him some time after, and he remarked to me that he would not be placed in the condition he was in again for one thousand dollars.

Case 5. — Falling sickness or epilepsy, as I diagnosed it. A lady 42 years of age, mother of a family, would drop down without any warning and lay apparently dead for twenty to thirty minutes. She was having the spells on an average of twice a week when I first met her. I treated her fifteen or twenty times and she wrote me three months after that she had but one bad spell since.

Case 6. — I was called to the bedside of a lady suffering with neuralgia. An M.D. sat by the bed, holding her, as she was wild with pain, had been in that condition for eight hours, and he had exhausted his skill and the patient was getting worse. With dispersive passes I stopped the pain within less than five minutes after entering the house, and it never returned.

Case 7. — A man of middle age called upon me but a few days since with an enlarged liver which was causing him some suffering and anxiety. I gave him a thorough treatment and entirely removed it, and he tells me that he has experienced no difficulty since.

Case 8. — I was called a week ago to-day to a case of diphtheria. It was not of the worst type, but was fast tending that way. I had supplied myself with sulpho-calcine, as you had recommended it when I was with you. I diluted it one-half and ordered it applied with a camel's-hair brush every half hour. It worked like a charm and in twelve hours the danger was past. She is now up and about.

I have thus given you a sample of the cases I have handled.

CASES REPORTED BY DR. A. J. SYMES OF CLEVELAND.

Case 1. — Sciatica of nine months' standing. Cured in twelve treatments; treated according to Sarcognomy. This case was under the care of two homœopathists, but without results.

Case 2. — Inflammatory rheumatism, two weeks' standing. Cured in eight treatments; treated according to Sarcognomy.

Case 3.— Asthma. This case was in charge of an allopathist. I was called in by a friend of the sufferer. I found him unable to lie down; was compelled to sit up all the time. One treatment enabled him to lie on his back, which position he was able to retain until he died two weeks later of heart disease so called. This also was treated according to Sarcognomy.

Case 4. — Lumbago. Cured in five treatments. This case was very severe, but yielded after the fifth treatment, and has not returned as yet and it is now eleven months since the last treatment was administered. This also was treated according to Sarcognomy.

Case 5. — This case was a determination of blood to the head, which caused a great deal of suffering. On examination I found his legs and feet were cold. He told me that he had been troubled in this way for over twenty years; there was no capillary action in the lower extremities. Ten treatments restored the capillary action and the head was relieved. He claims to feel better now than for the past twenty-five years. This, too, was treated according to Sarcognomy.

I could fill pages in describing cases similar to the above, but think these five cases will suffice. However, I will mention one more case that is under treatment.

A Case of Insanity. — She has had fifteen treatments and has improved very much. I have a great deal to contend with in this case owing to brutal treatment from the husband; but, notwithstanding, she has improved very much, and if I am allowed to keep on with the treatment have not the least doubt but that she will be restored to mental and physical health. This patient is being treated magnetically and electrically according to Sarcognomy.

DR. Z. L. BALDWIN'S EXPERIENCE.

Dr. Z. L. Baldwin of Lawrence, Michigan, speaks as follows of his experience after finishing his college course: —

"Regarding the value of Sarcognomy and Psychometry in this my first year's practice, —

"Sarcognomy has aided me much in applying massage and electricity successfully, as is attested by the number of chronic cases that come to me; while Psychometry aids me in determining obscure pathological conditions that a physical or oral examination would not reveal, also it gives me a knowledge of the patient that enables me to inspire the needed hope and confidence."

CASES REPORTED BY DR. ORRIN ROBERTSON OF TEXAS.

Chronic Cough. — Mrs. E. G. of Athens, Tenn., came to me in 1888. She was 74 years old and had a cough ten years. She had tried various remedies but all failed. It was called asthma, whooping-cough, consumption, etc., before my diagnosis. I found the respiratory muscles were irritated. I placed one hand on the lower dorsal region and held it there fifteen minutes and then held both hands on Health fifteen minutes. Two treatments twenty-four hours apart, and the cough was no more.

Mrs. O. C. L. of San Antonio, Texas, aged 47, had a very bad cough which had continued twenty-one years. She had doctored all the time but with no benefit. Doctors said there was incurable consumption. Expectoration was free; some blood. The skin was dry, but with night sweats. I was led to believe the original cause was a fracture of the lower dorsal and perhaps softening of the cord at the eleventh dorsal vertebra, but now there was an irritation in the lungs and the stomach was involved; consequently eating, breathing or moving made the cough worse. And as the lower dorsal region contains the ganglia which emit the splanchnic nerves that govern all the abdominal viscera, and as the stomach was affected from so much medicine, constipation was also a trouble. The cough now starts in the lungs by irritation and is conveyed by the pneumogastric nerve to the medulla oblongata, and as the stomach and lung irritation is so great it is sent downwards to the lower dorsal region and the convulsive expiration is produced. The phrenic nerve, in the middle of the cervical region, is started and it produces an act of inspiration by the diaphragm. The upper dorsal region starts the intercostal muscles lifting the ribs and the irritation passes down to the abdominal muscles. As the whole system was involved, both nerves and muscles, I gave hot-air baths — alcohol as the excitant, with California laurel (Umbellaria Cal.) and damiana in the alcohol, following up each bath with cold salt-water shower bath. Then as an embrocation I used the above medicines with helonias dioica, equal parts. I used this freely up and down the spine, holding one hand on the eleventh dorsal vertebra fifteen minutes at a time. I held one hand on Absorption and the other on Adhesiveness, to assist digestion. Made rapid manipulations downward from Defecation for constipation; then passing galvanic currents from the lumbo-sacral junction to Health and from the stomach to Health, holding one hand on the cephalic region on the back and the other in front. This process was continued six times every other day, and after twelve days she was free from cough and was again a sound woman. I might cite other cases, but this will suffice.

Uterine Cases. — Mrs. J. L., age 32, had for years inflammation of uterus and ovaries. She had spent one year at Hot Springs, Ark. Came home disgusted, as she was unable to work and not able to doctor, and saw no sign of improvement. I gave her the hot-air bath, following with cold water every day. Then I made rapid passes up and back from mons veneris toward the cilio-spinal centre, and held my hands on Sanity and Health. I passed light galvanic currents, with aconite and macrotys on the electrode, from the ovaries to Health. She used a wash of fluid extract helonias 1 part, warm water 40 parts, twice a day. Internally: tincture aconite 5 drops, macrotys 10 drops, pulsatilla 20 drops, water, 2 oz., — one teaspoonful every three hours. And in thirteen days she was a sound woman, able to do all of her work —washing, ironing, etc.

Mrs. L. R., age 37 years. Five children. Had shortness of breath, lower limbs weak, melancholy, muscular system weak, inflammation of ovaries, skin dry, pains in back at lumbo-sacral junction, pains in back top of head, eyes growing weaker and burning, prolapsus uteri, inflammation of stomach and hemorrhage from womb. Doctors said the womb was lacerated and the only remedy was an operation. She had for fourteen years been in this condition and gradually growing worse; now pains in the chest with a dry, hacking cough, — melancholy. I passed galvanic currents from Melancholy, in front of the anterior margin of the ilium, to Cheerfulness at the arm pits, also made passes with the hands. I gave tincture pulsatilla, twenty drops a day; hot sitz baths, twice a day; and cold water, once a day; with enemas of fluid extract helonias one part, water forty parts.

The muscular system was weak; therefore I stimulated Vital Force on the summit of the thighs and on the head, and Power on the top of the shoulders, also stimulated Locomotion by gentle percussions; then holding the hands and also calf of the legs, and used on my hands as an embrocation damiana and laurel, equal parts.

There was prolapsus uteri. For this I gave very light galvanic currents for sixty minutes a day and dispersive passes from the mouth of the vagina to Health and Sanity, and vitalized by the lower dorsal and lumbar regions with fluid extract helonias on the hands. I also applied the positive pole to the cervex and negative on lumbo-sacral junction to vitalize back. I gave hot-air baths at 135° every other day, finishing with cold water, leaving her to walk all she could. Internally she took fifteen drops of helonias three times a day.

For shortness of breath, I held my hands on Inspiration on the ribs, thoracic or pulmonic regions on head and body, and stimulated Health by gentle percussions and holding my hands on the same to give a healthy tone. I also stimulated Respiration on head and body to deepen breathing.

The hemorrhage from womb I stopped by gentle percussions on palms of hands and bottom of feet, and on shoulders, to draw the blood from that centre. I also made passes from the lower limbs and from the womb up and back to the cilio-spinal centre. All these troubles gradually disappeared, and after one year she is a strong, healthy woman and can do all of her own work.

Mrs. L. T., 26 years old; had one child; an operation performed — uterus scraped — and had three regular M.D.'s; and for three weeks was flat on her back, and they said she would die from the hemorrhage. I was called. I gave gentle percussions on palms of hands and feet and shoulders, made passes from the womb to the shoulders, gave her a cold salt-water bath, and the flow stopped. That day she walked the floor, and the fourth day was down in town and riding on street cars. This was one year ago and her health has been good all the time, and now the regulars say she only had the hysterics.

The proper application of Therapeutic Sarcognomy will cure almost any female disease at once; and as to hemorrhages, it will not fail. I believe I could stop the menstrual flow eight times in ten cases with the hands.

Natural Sight Restored. — The employment of eyeglasses to improve the vision has long been practised, but the proper application of the finer forces will do away with glasses in a majority of cases. To prove this position I here cite two cases in San Antonio: —

Mr. J. H., 82 years old, had worn glasses twenty-five years all the time, even in eating and walking about. His eyes were sound, but weak; the pupil was contracted, the cornea and lens were flattened.

Distant objects were distinctly seen; while those near could not be distinguished, — presbyopia. His general health was fair. I used warm water on my hands and made passes with the finger tips from the nose outwardly over the lids thirty minutes, as the lids were dry and stiff or hard. I then placed one hand across the forehead, over the eyes and superciliary ridge, and the other on the second dorsal nerve, to expand the pupil of the eyes. Held my hand there fifteen minutes. I then placed one hand on the median fossa (below the occipital knob) and the other on the forehead, as above mentioned, to strengthen the optic nerves (as their origin is in the tubercula quadrigemina) which are between these localities, and in three days his eyes were perfect. He could read any kind of print at a distance of twelve inches.

Mrs. M. C., 83 years of age, had not seen her children in three years to distinguish them apart. Had not seen the moon, stars, etc., and had long since quit glasses as they were of no benefit. Her eyes were good once, but now worn out. I treated the eyes as in the above

case, and also held the tips of my fingers over the organs of Shade and Light, and in seven days, thirty minutes each day, she could see the stars and moon, and tell her children apart and read large print. Both of these persons lived twelve months after treatment and their eyes remained the same ; therefore is it not probably true that spectacles are unnecessary at any age, as we can have perfect sight without spectacles till death? "Old eyes made new," not by massage, glasses, cutting or burning or drugs, but by the application of the principles of Therapeutic Sarcognomy. I will not cite other cases here, although I have made just as radical cures on those suffering many years with the same defects ; and I have cured cases of nyctalopia, hemeralopia, granulated lids, scrofulous inflammation, ophthalmia tarsi, conjunctivitis, astigmatism and myopia, and removed two cataracts, by this science. In view of the very rapid increase in optical defects in each succeeding generation the time is at hand when all should ignore the harsh material treatment and turn to this science as the only safe and sure means of correcting these evils.

Deafness. — Mr. J. A. M., 62 years old, had been entirely deaf in one ear for twenty years. I made gentle passes up and back from Disease to Health and from Insanity to Sanity, on the head. Held my finger tips on the front part of Sensibility, on Sound, and also on Sense of Force, at the outer contours of the eyes. This was continued fifteen minutes at a time, and in three treatments he could hear a watch tick ; hearing was perfect.

Mrs. E. S., 31 years old, became perfectly deaf from drinking blueing, trying to cure some blood disease. This was eight years ago and the ears remained the same. She could not hear thunder. I treated her ears as in the above case, and used a little almond oil, and she could hear ordinary conversation and hear a clock tick.

Mrs. H. C. had not heard out of her right ear for seven or eight years, and only partially for twelve years. It gradually grew worse for four years, and for eight years she had kept it stopped, as she had given up all hope of its restoration. I treated her only three times with my hands, as in the above cases, and she could hear distinctly with that ear.

Mr. C. H., 15 years of age, had trouble with his ears from birth. Could never hear distinctly, but had a roaring all the time. Colds made them so he could scarcely hear at all. There was great pain most of the time. I washed the ears out with water and held my fingers on Sound and Sense of Force, and made passes up and back from Disease to Health and from Insanity to Sanity, and in eight treatments, thirty minutes at a time, his ears were sound and hearing perfect, and have remained so, although fifteen months ago.

Mr. J. G., age 47, had trouble with his ears when he was 15 years of age. Could not hear at all when he had colds. Had risings and roaring all the time. During the war he had camp fever, and doctors claimed it settled in his ears. He had taken a great deal of quinine. He had not heard out of his left ear for twenty years, and but little out of the right for eighteen years. His general health was fair. I treated him nineteen times as in the above cases, except dry cupping on the back of his neck, and he gradually improved. He got so he could hear ordinary conversation, dishes, knives and forks rattle, fire sparkle, shoes creaking, rap on door and chickens cackling, which he had not done for twenty years. His hearing remained the same until his death, some nine months later.

Mrs. E. G., 74 years old, had been deaf fifty years, and in six treatments with my hands, as above, she could hear the clock tick, and knives, forks, etc., rattle. This was fifteen months ago, and hearing is yet perfect. With such evidence before me, and a number of others I could cite, I am led to say, in the light of Therapeutic Sarcognomy, "he that hath ears to hear let him hear."

STATEMENT OF A MEMBER OF THE LEGAL PROFESSION, WHO HAD BEEN INSTRUCTED IN THERAPEUTIC SARCOGNOMY.

In applying your instructions in Psychometry and Sarcognomy my success as an amateur has been very encouraging. I frequently succeed in getting impressions and describing cases on my first interview, before coming in contact with the patient, and whenever I apply the principles of Sarcognomy in treatment the patients are often surprised at the unexpectedly favorable results.

In January, 1889, I was called on by my friend Dr. F. of Lowell, a regular M.D. and LL.D. (having practised law in his earlier years), to tell him truly his condition, as two or three physicians had said he could not live over six days, that he had a cancer on the left side of his face, and that his heart difficulty was alarming as he was liable to drop off instantly. He wanted to arrange his business so that his wife would have no need of an administration upon his decease.

He was about fifty years of age, of a mental-motive and impressible temperament, so that I could remove the pain from his face instantly.

His so-called cancer has been cured under my treatment, without medicine; and I might claim it as a cancer cure according to medical opinions, but in fact I do not believe that it was a cancer, and found that it was better or worse as his general health was modified.

I might also claim the cure of his heart disease; but, from the ease

with which I controlled it, I am satisfied that it was a nervous affection.

He had been suffering from malaria for twenty-seven years and his nervous system was thoroughly deranged. I was with him in some of his worst attacks, which I need not describe, and gave him prompt relief. He soon resumed his labors in comparative health, which was very gratifying, considering that he had been unsuccessfully treated with digitalis for his heart and cocaine for the pains of his face, and many other remedies, and enjoyed or endured the regular practice for twenty-seven years with no success. At present he is in improved health and entering active employment.

In April I saw Mrs. M. of Lowell, aged 52, suffering from the removal of two cancers from her right breast by the knife, and then undergoing treatment by plasters. Her last regular physician gave her morphine, and she was obliged to continue it hypodermically several times a day. Her appetite was variable, her right arm was nearly useless, and she suffered mentally from the condition of her daughter, a teacher, who had a cancer on the right side of the body (so recognized by several experienced physicians) and under the treatment of three physicians had received no help. Her menstruation was nearly suppressed for six months, and her right arm was so affected she could not use it in her school duties.

I perceived on the first visit that the mother could not recover from the cancer, but told her she could be relieved from the necessity of using morphine (in which I succeeded) and that her daughter could be cured. I relieved the daughter's severe headaches and restored her menstruation in the first month, and in less than four months the cancer was dispersed and her school labors resumed. These results were effected by brief treatments, usually not exceeding three minutes each time, and without removing her clothing.

In July, '89, I saw Mrs. Y. of Lowell, who was suffering from nervous prostration and general debility, and, though she had been under the care of three regular physicians, had received little or no benefit.

I diagnosed her case, discovering symptoms quite common at her age, and informed her that in two weeks she could visit the beach, as she wished. I treated her according to Sarcognomy, corrected her diet and gave her the tea of red and white clover blossoms which you recommended, and in two weeks she was off visiting, fully restored.

This patient was called upon by a Mrs. H., aged about thirty, fleshy and jolly in appearance, whom no one would suspect of much suffering, and I surprised myself with the correctness of my off-

hand diagnosis. She asked if I could tell her what ailed her, and without moving my chair, being about ten feet from her, I told her without asking a question that she had injured her spine and produced a congestion in the cervical region; that she was suffering much, that her lower limbs were weak and becoming paralyzed on her left side, that she suffered from constipation and uterine displacement and had some water about the heart, though not generally dropsical. "Who told you all this?" was her natural question. I replied that as I had never seen her before and did not know her name I discovered it only by psychometry. "Well (said she) I did hurt my spine, and I do suffer just as you describe. I am constipated and my left limb is numb up to my knee. I had three physicians for nearly three days before the delivery of my last child, and I do fear dropsy and my doctors have failed to relieve me." Her physician, however, ranks deservedly high in his profession.

Mrs. H. E. M., aged 60 years, a resident of Boston, was suddenly attacked with rheumatism on the eve of February 9, proximo, and on the following morning her right shoulder, arm, wrist, little finger, hip, knee and foot were swollen with inflammation and very painful. She was helpless; could not turn herself in bed without assistance. Her right shoulder, arm and wrist, hip, knee and foot (ankle) were stiff and useless.

The writer being her agent in Lowell, she had her landlady write him to come to Boston at once. I saw her the following day, and found her sick in mind and body, with high fever, and under the medical care of Dr. H., Park Square, Boston. Still she desired me to diagnose her condition Psychometrically. I did so and found her impressional, and that Psychological treatment was the remedy and method for her recovery; by using which in about two minutes she could use her right arm and hand so she could dress herself; and the tenderness of head left her, so that she combed her hair; and she could turn herself in bed without assistance.

After receiving this relief she continued under treatment of Dr. H. until about March 20, when Dr. G. came, in consultation, and the writer is informed that they decided that her foot must be amputated and advised that she be sent to the hospital immediately. Thereupon she wrote me again. I saw her about March 22 and found that her foot had been lanced on both sides and that her case was critical. I treated her then, relieving her pain and enabling her to sleep, but did not take full charge of her case, not being in Boston, and under the influence of her nurse and physician she was persuaded to go to the hospital and was sent there about April 8, proximo, and remained there forty-four days, when she was dis-

charged as incurable, with a plaster cast about the ankle and foot, which had been there about two weeks. The pains were unbearable, allowing no sound sleep or rest in body or mind. I saw her in Boston about May 27 at the Hotel Johnson, 237 Shawmut Avenue, and found her in a sad condition. She could not put her foot to the carpet without severe pains. I examined her condition and treated her again. I took her cane and bade her to rise and stand upon her feet and then walk about the room. She did so with astonishment, for she had ordered crutches. I told her "No;" that I was sure that she could be cured, and that I would secure new lodgings. The next day I called for her and she walked three blocks and took cars for Allston, some four miles away, and before I could secure a carriage she walked some five blocks to 65 Braintree Street without assistance save her light cane. I treated her before leaving for Lowell and told her to use her cane as little as possible and in one month she would not need it. To the surprise of herself and her landlady, on the 10th of June (thirteen days) she was able to ride into Boston alone, make several visits, and walk from Shawmut Avenue and Dover Street to the Providence Depot and to the Public Garden, and, after resting, take the electric cars for Allston; nevertheless she rested nicely that night, and at this writing she can walk a mile and return without resting, and intends to commence her usual avocations about the first of July, '90.

[Mr. H. states that in this case he assisted his treatment by some medical agents, — a little cascara, clover and hydrastis and some small blisters applied twice on the foot.]

I have not made use of electricity in my amateur practice, but have been familiar with electric treatment for twenty years, though not attracted to its use. I was much gratified by your discovery of uniting electricity and magnetism and your experiments on myself. I think your electro-magnetic current far excels anything known in that line, and I observed that whereas the negative pole of the common current is most powerfully felt, your electro-magnetic current was far more powerful in the positive pole, because charged with magnetism from a strong magnet, and yet was far more agreeable than any electric current. It affected favorably the back brain and the kidneys, and I slept very soundly after the treatment in the evening, whereas heretofore the electric current alone has caused wakefulness and irritation. I would suppose that any one would enjoy the application of the electro-magnetic current, from its wholesome, soothing influence.

LESTER A. HULSE.

The foregoing statements do not convey a complete idea of rational practice, as they do not develop the medical, pneumatic and

electric methods, the results of which may be as marvellous when guided by Sarcognomy as those of the nervauric practice that has been described.

The power of pneumatic treatment, as shown in the chapter on that subject, is far short of what it may be when guided by Sarcognomy.

Medical treatment, when guided by psychometric exploration of diseases and remedies, has a marvellous power and is continually reinforced by new discoveries of therapeutic potencies and the power of intuition to lead beyond the acquisitions of science.

Electric treatment by the new methods combines with the nervaura and the medical potencies, and not only changes the balance of functions, guided by Sarcognomy, but disperses morbid conditions and fills the patient with a combination of healing influences, heretofore unknown. Moreover in the new combination of static electricity and magnetism demonstrated in 1890, it furnishes that desideratum, a reviving stimulus for the entire nervous system, and a soothing tonic for all the tissues which sustain organic life, thus building up the constitution in a genial manner, which has heretofore been possible only by means of that nervauric treatment which is far from being universal in its application and success, while the electro-magnetic treatment has a potency which none can resist.

When asked for the proper name to designate the new system of practice, which introduces Sarcognomy, I speak of it as the ANTHROPOLOGICAL SYSTEM OF PRACTICE, for it is based upon the entire science of ANTHROPOLOGY — all the truths of which contribute to its completeness. This is its distinction from all other systems, which are based upon very limited conceptions of the constitution of man and the resources of therapeutics. The conception of the healing art has been so limited as to be expressed by the phrase, "the Science of *Medicine*," instead of the proper word *Therapeutics*, as if the healing art consisted entirely of using medicines. The colleges of the Anthropological system will be known as colleges of Therapeutics.

CHAPTER XIX.

THE HYGIENE OF SARCOGNOMY.

Cultivation of the higher organs indispensable — The various methods illustrated — Effects of high altitudes on the lungs — Importance of costal respiration — Illustration of the subject by the *Georgia Eclectic Medical Journal* — Relation of the upper thoracic region to the ethical — Exercises of the limbs — Influence of altitudes — Importance of nutrition to the brain — False theories of a medical author — The principles that should guide our exercises — Evil effects of excessive muscular culture and passional excitement — Plan of culture proposed — Cultivation of the soul and religious sentiments as the basis of health — Of social intercourse and smiles — Importance of activity, energy and sport — Causes of exhaustion — Of vocal culture and oratory — System of culture devised by Mr. Checkley —Treatment of the skin —Tight lacing — Thoracic hygiene and atmospheric conditions.

THERE are certain obvious hygienic laws, indicated by the principles of Sarcognomy, which should be understood by all as well as by the medical profession.

The most important principle is found in the superiority of the higher portions of the body, morally and intellectually, and their generation and conservation of vital force. This makes it absolutely necessary to our happiness and success to practise the SUPERIOR CULTURE — the culture of all the higher powers, as illustrated in the chapter on Health.

First and pre-eminently we should cultivate the brain, and especially cultivate its higher powers, — love, hope, energy, duty and persevering firmness, —for the higher the culture the nobler and longer will be the life. These qualities sustain all the powers of life and fill the body with healthy and joyous efficiency. They defy disease, despair and insanity. Consequently, the first lesson of true hygiene is LOVE, the second is WORK or energy, and the third is ASPIRATION or self-respecting ambition. (This is true brain culture. The common idea of brain culture is intellectual effort, either in connection with sedentary life, which impairs all the energies, or with active employments, which fatigue. This is not brain culture but brain exhaustion. The intellect and the physical energies are both exhaustive.)

There is no permanent and solid foundation of health and success without these higher qualities. Hence, our hygienic law is: incessant industry in the society of our fellows and the continual making of

friends, which is the test of our active virtues. If we do not win love and friendship our moral capital is not in active use, and if we have not accomplished anything of value we are moral paupers. A life without enthusiasm and energy is a poor affair. Greatness of soul is the only great success, and soul culture takes precedence of all other culture. The brain should be warm; a cold-brained man is the one commonly called cold hearted.

The glowing condition of the brain is accompanied by a similar glowing condition of the chest, and from these two comes the life that animates the entire person.

Looking at the body we find the normal superiority of the chest, which in its upper portion corresponds to the upper half of the brain. From the thorax proceed the currents of richly vitalized blood, which supply all parts of the body with vitality. Hence, if we would increase the stock of vitality, we must increase the development and activity of the chest, which can be done only by a life of action. The idle man degenerates, the busy man develops. Degeneracy of the thorax implies degeneracy of the whole constitution. In the Prussian army narrow-chested recruits, whose chest circumference is less than half the length of the body, are dismissed as predisposed to consumption.

The action should be symmetrically normal, not manual labor alone, — especially not manual labor performed as a repulsive and tiresome task, — but exertion in which we are interested, which calls forth our ambition, energy and enthusiasm. Some such exertion every day is essential to normal development, essential to the expansion of the lungs.

The thoracic development which does so much for life, health and energy may be cultivated also by conversation, declamation and singing. By engaging in these daily we increase our stock of normal life and health. They expand as well as vitalize the chest. There is no labor performed so easily and with so little fatigue as that which is accompanied by singing. A citizen of New Orleans named McDonough many years before the war gave to his negroes an opportunity of emancipation by extra work to buy their time piecemeal. They would buy one hour a day to begin, and with that advantage buy the remaining hours with increasing rapidity. Animated by such hopes, they astonished spectators by the zeal with which they worked, early and late, *singing at their work.*

The practice of singing, it is well known, promotes the health and the development of the chest.

The expansion of the chest indicates the expansion or development of the noblest elements of humanity, for the higher organs of

the brain are in so close a relation to the chest that its development becomes to them an invigorating co-operation.

Thoracic expansion should therefore be steadily sought by all, and when it is not obtained by active exertion, which is the normal method, it may be sought by the expansion of the chest in forced respiration. We should, five or ten times in the day, inflate the chest to its fullest capacity for several minutes, and in walking we should make it a practice to inflate the chest and firmly hold the breath for a fourth of a minute. ("A late account of the gypsies," says Dr. E. Cutter, "states that every morning they go out early and inhale full breaths, hold them, pound their chests hard in expiration, and then inhale deeply again, and so on.")

The inflation of which I speak is by the ascent of the ribs instead of the descent of the diaphragm, and its tendency is to develop the thorax and diminish the prominence of the abdomen, thus giving a desirable form, promoting the growth of the lungs and improving the quality of the voice as well as the aeration of the blood. I regard these systematic exercises in full breathing as of great hygienic value and highly beneficial to the nervous system and the higher sentiments. In expanding the upper portion of the chest and restraining the lower, the abdomen being drawn in as the chest is elevated, we produce an amiable and womanly sentiment. One who wishes to imitate a woman would find this the most natural way to do it.

The very great benefit of high altitudes and mountain ranges from two to four thousand feet high in developing higher health and a more spiritual temperament is produced chiefly through the expansion of the chest required by a rarer atmosphere and the more active exhalation of the lungs. This beneficent influence has been amply realized in the elevated portions of Colorado, California and Northern Georgia and the Carolinas.

There is abundant evidence of the protective influence of high locations against consumption. According to Dr. Valenzuela of Madrid (in *L'Union Medicale*) the deaths from consumption in Spain corresponded inversely with the altitude, being twenty per cent. of the patients in locations less than a hundred metres above the sea level, ten to twelve per cent. at an elevation of from one hundred to five hundred metres, while above twelve hundred metres phthisis did not exist. Mr. Geo. Foy states in the *Medical Press and Circular*, of July 10, 1889, that he found phthisis entirely absent at an elevation of two thousand metres.

Dr. Valenzuela appears to have shown that the benefit of high locations in resisting consumption is due to *increased respiration*, by

producing this increased respiration artifically, which he did by placing the patients in pneumatic chambers, in which the air had less of oxygen and more of carbonic acid, so as to compel additional respiration. He reports the successful treatment of five hundred cases in the early stages. The patients increased in weight and in thoracic measurement.

Patients have often cured themselves by an active out-door life which greatly increased the respiration. As Prof. Mays expresses it: "The question of curing the disease does not depend on the purity or freshness of the air, or upon the number of bacilli which the atmosphere may contain, or upon the amount of oxygen which may be introduced into the body, for these are all secondary considerations, but it is simply a mechanical question, a question as to the best mode of expanding the lungs, and especially the apices of our round-shouldered and flat-chested patients, of removing the infiltrated products already existing, and of enhancing the constitutional resistance."

The elevated regions from the Rocky Mountains eastward to Kansas, with an elevation above the ocean from two to seven thousand feet, have a dry atmosphere, free from malaria, extreme variations of temperature, and a low barometric pressure proportioned to the height.

The whole region, extending into New Mexico, is marked by the superior health of the inhabitants and a general improvement of health in those who settle there. Fevers and consumption are extremely rare, but owing to the greater activity of the lungs and skin, and the great variations of temperature, pneumonia and erysipelas are the most prominent diseases, next to which may be mentioned bronchitis, rheumatism and uterine hemorrhage.

"Consumption," says Prof, F. Donaldson, "is most prevalent at the level of the sea, and seems to decrease with increase of elevation, according to Fuch, Von Tschudi and Mackey. At Marseilles, on the seaboard, the mortality from that cause was 25 per cent.; at Hamburg, 48 feet above the sea, it is 23 per cent.; while at Eschwege, 496 feet above the sea, it is only 12 per cent. At Brotterdale, 1,800 feet above the sea, the mortality is reduced to 0.9 per cent. Dr. Glutsman has published a number of interesting facts in regard to the immunity from consumption in very high localities, such as on the Andes of Peru, table-lands of the Rocky Mountains, in the towns of Santa Fe de Bogota, at an elevation of 8,100 feet, Potosi, about 12,000, and the Puna region of the Andes, at 11,000; in Europe, many places on the Alps, as in Styria, Carniola and on the western section of the Pyrenees. In Africa immunity is said to exist on the

plateaus of Abyssinia. In Mexico, at 8,000 feet above the level of the sea, it is but rarely met with; and in Asia, on the high plateaus of Armenia and Persia.

A retreat for consumptives has been established in the cool climate of Davos in the Swiss Alps, a mile above the ocean level, and the experience of twenty years is highly favorable.

As an exercise for the promotion of health I would recommend the exercise of lung expansion, to be continued until an expanded chest becomes habitual and permanent.

An ingenious student of the principles of self-culture (Mr. Edward Checkley of Brooklyn, N. Y.), having developed a delicate constitution into extraordinary vigor, is very enthusiastic and confident as to the value of thoracic expansion, especially of the upper portion of the chest. Mr. C. says that he observed in mismanagement of respiration a principal cause of disease. One class, with round shoulders and a stooping gait, with drooping heads, having more of abdominal than costal respiration, he found inclined to consumption, heart disease, paralysis and dyspepsia. In another class, which used the base of the lungs to the neglect of the upper portion, throwing the body backwards and projecting the abdomen, he found tendencies to dropsy, rupture, apoplexy, paralysis and kidney diseases. When the body is held erect, the muscles of the abdomen well braced, and respiration effected chiefly by the upper portion of the lungs, he anticipates great increase of health and strength, with freedom alike from consumption and obesity. Hence he believes that for proper physical culture we should seek the development of the lungs, especially upwards, rather than development of muscles. Mere muscular exercise he considers of very little importance in physical culture, but exercise of the brain in prompt and accurate use of the muscles he considers important.

He maintains that the sternum should be flexible (composed of three parts), and in breathing the upper part should be strongly projected, rising and falling as in a woman. By teaching this method he claims to have greatly improved the health of many persons.

The doctrines and observations of Mr. Checkley are a strong confirmation of Sarcognomy, which shows that the upper half of the brain and upper half of the chest are the great sources of normal healthy life and development.

Mr. C. deserves much credit for his original observations and hygienic suggestions, which are certainly of practical value, but we must not forget that, although the upper portion of the chest is the most important, the entire chest is necessary to the greatest vigor, and any mode of life which restricts the development of the lower

portion impairs the vital force. Sedentary employment does this. For a full development of the chest we should have, every day, the exercise of running, or something equivalent, compelling the deepest respiration.

The *Georgia Eclectic Medical Journal* has advocated full breathing as follows : —

"*Full breathing a therapeutic agent, restorative and curative.* — Frequently has attention been called in these pages to the great value of cultivating the habit and practice of filling the lungs to their fullest capacity as a curative measure in all scrofulous and other constitutional diseases. Recently a case of confirmed sleeplessness, that had existed for nearly a month, and had resisted the treatment of two judicious physicians, was rapidly cured by making the patient fill his lungs to their fullest capacity by forced and powerful efforts, and to hold the lungs full for various lengths of time, — 10 seconds up to 30 and finally up to 45 seconds, — then expel the air, and after a rest at tranquil breathing for five, return again to this forced effort at filling the lungs, which was repeated at intervals of an hour or two during the day. At first the effort was as exhausting and trying as any hard manual labor or violent exercise. After a few hours' practice, and screwing up a heavy force of courage and will-power, the patient could hold the lungs full for 20 seconds at a time the first day, and repeat the act several times during the waking hours. At night his chest muscles felt sore, but he was much refreshed, felt tired and went to bed at 10 o'clock P.M., and soon fell into a refreshing and calm sleep, which lasted till 3 o'clock A.M., the first he had to call sleep for several weeks.

"In constitutional diseases dependent on mal-nutrition, and associated with impaired assimilation of the kind that is belonging to the deeper tissue renovation and repair, this practice of breathing in oxygen to the fullest extent is of remarkable curative powers. At first the effort is very trying and exhausting, but, by plucky effort and a full use of will, all the other difficulties to its use can be overcome. Children can be taught the art as well as adults when proper care and attention is given to imparting instruction and superintending these respiratory efforts. It requires patience, persistence, and a full measure of persuasive address to manage children and young people successfully. We have seen thin-chested children, seemingly as frail as a cracker, pale, emaciated, with deficient digestive powers, and physically like infants in strength and endurance, brought out and raised up to robustness of constitution in a few weeks' practice of this most valuable therapeutic measure. Teach people to fill the lungs *completely*, not half full ; they must draw in the breath to fill

the whole of the lungs, from apex to base. This is hard work at first, but trial and stick will remove all the trouble in the way. Feeble people have not, perhaps, had the full physiological power of their thoracic muscles. The lungs have never been filled, and the quantity of oxygen necessary to vitalize the tissues and animate the nervous centres has not been provided; hence, these people go on in life half dead and die early. A full-breathing pair of lungs are a full measure of life-giving and life-supporting organs. Endurance means the quantity of oxygen the lungs can take in and the quantity the tissues can store in their recesses. This storing of oxygen is a mystic force, and the one we are trying to know more of. The power to store is the energy of the system to take and use. All these functions can be cultivated and enlarged by proper practice.

"There is a man here whose age is 86. He says he would have died 50 years ago but for his practice of filling his lungs as full as he could three or more times a day. He has been a feeble man all his life; was never stout — always dyspeptic. At one time he believes he had consumption, which he cured by this practice.

"A number of scrofulous and feeble, puny, pale and cadaveric-appearing children in this town, who have grown much more healthy and are now vigorous and rugged, were made so by nothing else than practising this lung-filling exercise. Prof. Goss says he is now 50 per cent. better off, physically, since he commenced this practice.

"The point is to teach people to fill the lungs and to cultivate the power to hold the lungs inflated as long as possible. This will strengthen the respiratory muscles and deepen the chest capacity. The nervous system will be strengthened and made firm; the blood and tissues will be enriched and the liability to take cold or take disease very much diminished. Nothing restores a man after a hard day's work so much as to fill his lungs to their fullest capacity in the open air several times during an hour.

"People in whom the respiratory murmur over the apex of the lungs is weak, often hardly perceptible, the upper portion of the chest walls on both sides flat, health and digestion feeble — such ones are frequently transformed into strong and rugged persons by practising lung-filling systematically, making daily exercises. Then the respiratory murmur over the apex becomes loud, full, soft; the chest wall expands in all directions and the vital capacity is considerably increased.

"There is more in this practice than the average doctor is able to perceive; but resort to it, using judgment in teaching it, and being persuasive and encouraging in your address. The confidence and courage of your patients will be enlarged, and success will attend your efforts."

The higher emotions are known to be inspiring. Love produces that full inspiration which is called a sigh. "The emotions that swell my bosom" is a common oratorical expression. The depressing feelings lower the chest and mental agony or physical pain produce its compression, forcing out the air in a groan, a cry of pain or a scream. The violent passions are expressed by the diaphragm rather than the ribs. Expressions of disgust, scorn and hate are made with depressed ribs.

The exhausting efforts of the student are accompanied by unexpanded lungs and consequently a great lowering of vital power, which unfits him for efficiency in society. All active pursuits give that expansion and consequently development of character and power, with this difference, that when the pursuits are those of the selfish forces they develop the lungs downward, which gives force and activity but not sustaining power; but when the activity is less selfish, when it brings out the warm, friendly emotions combined with heroic firmness, then there is a harmonious expansion which tends away from fatigue and depression, giving to the brain and upper chest a fountain of power and delight in action, — a steady, calm, sustaining energy.

This condition may not be readily forced by pulmonary exercises, but pulmonary elevation does greatly assist emotional elevation, and with a confirmed habit of such expansion it will be much easier to develop the faculties that make health and happiness. Hence I would urge upon all the practice of pulmonary expansion by elevation as a powerful adjunct to *moral* culture and *hygienic* culture, to the resistance and conquest of disease. How much it will accomplish I cannot say, but, having entire confidence in the laws of Sarcognomy, I venture to assure my readers that they will be well repaid for such exercises in themselves, and physicians will find it profitable to prescribe them for their patients, especially if they are combined with rousing, spirit-stirring songs, such as the Marseilles Hymn, Star Spangled Banner, John Brown's Body, Nearer My God to Thee, Exile of Erin, and spirited hymns.

Such songs, sung four or five times daily, make a great addition to the moral power, as they bring out the emotions. If we do not sing we may bring in the moral power, though perhaps less effectively, by direct evocation of the emotions. Let us think intensely, as we expand the chest, of the Divine power, to which we aspire with devotional feelings, or of the loved and lost, the dear beings whom we behold no longer, who are waiting our arrival in the better world. If we love them deeply, this loving thought will inspire us and make our pulmonary inspirations effective.

That ethical culture is one of the most powerful means of maintaining superior health is one of the most important lessons of Anthropology. But what I mean is poorly represented by the words ethical culture, which generally suggest a meditation or a disquisition upon the proper rules of life. True ethical culture is the active exercise of the higher emotions, — the love of the mother for her child and her husband, and the active service that she gives; the happiness of a joyous family circle, where each contributes to its harmony and mirth; the patient labor and watchful devotion which sustain the family; the struggle to perform every duty; and the charming, sympathetic manners, springing from an unselfish nature, which continually win friends. Indeed ethical culture might be defined as winning friends and making all happy around us, while not neglecting to defend the right and uphold the truth.

As to physical exertion, Sarcognomy suggests that the lower limbs should have regular but not excessive exercise to sustain the activity of the lower half of the abdomen, with which they are associated by the spinal system, and to promote animal warmth, depth of respiration and active circulation.

The basilar organs and passions, with which the lower limbs are associated, although they antagonize and in excessive action overpower all the higher qualities, do nevertheless in their normal action sustain the upper occipital region (as combativeness supports firmness or vitality supports love) and invigorate the whole brain by increasing the force of the circulation.

The activity of the brain cannot be maintained in a one-sided manner, but requires the radiation of its energies to the body to maintain the blood-making and blood-circulating power. Hence, the exercise of the lower limbs, which is a basilar exercise, is necessary to increase the active manifestation of brain power, and thus give a more vigorous health. The stirring hunter or the man of any active pursuits has a much more active brain than the scholar who confines himself to a sedentary life; but if this activity be carried too far, it greatly diminishes the capacity for calm and correct thinking and the control of the passions.

The exercise of the upper limbs is associated with the energy of the upper half of the body and the superior posterior regions of the brain. Hence, exercises of the shoulders and arms are more tonic and less exciting than exercise of the lower limbs, and have more sustaining, tranquil influence over the nervous system, — an effect which is said to have been recognized by the faculty of Johns Hopkins University. The health-lift has been highly appreciated by those who have used it, and rowing is a more beneficial exercise than running.

Systematic exercises which develop chiefly the shoulders are manifestly, according to Sarcognomy, the most effective for strengthening the constitution and building up the health. While the arm above the elbow has the more tonic relation to the thorax, the arm below the elbow has a close relation with the upper abdomen, and its warmth materially assists digestion and assimilation.

The exercises of the arms also have a tendency to develop a moral force of character of a higher grade than that which is promoted by the lower limbs, — an energetic ambition, free from violence.

Sarcognomy also explains the influence of attitudes. The erect attitude gives the influence of the gravity of a column of blood about five feet high, exerting a pressure of rather more than two pounds to the square inch, withdrawing the blood from the head to the body, and from the upper to the lower regions of the brain. The erect attitude is therefore the attitude of physical force and restlessness, of animal passion apd appetitite.

A standing audience is in the proper condition for eloquent, inflammatory harangues, but not for calm, philosophic thought and scientific understanding. These require a sedentary attitude in the listeners to be appreciated. The sedentary position is the necessary attitude for calm, well-governed or ethical thought, the quietude of the lower part of the body producing quietude of the lower part of the brain.

The horizontal position removes the two-pound depressing or animalizing influence, and gives the superior regions of the brain and the trunk their proper ascendency. Hence, on the pillow men have their best thoughts, make the best resolutions, feel the most affection, and are more capable of regretting their errors. They have also more of calm enjoyment, and the brain in its higher powers regains its controlling influence and becomes capable of renovating the body. Whenever health fails entirely, we are compelled to keep the prostrate attitude, in which the "*vis medicatrix naturæ*" asserts its renovating power, especially when friendly and hopeful emotions are called out. Every effort to assume the erect position by the prostrate invalid endangers his recovery by diminishing the superior cerebral circulation, and taxing the brain for bodily exertion which it cannot sustain.

In the horizontal position the heart acts more normally; the pulsation is less frequent and the circulation more efficient. Hence, horizontal repose for the restoration of and nourishment of the brain is very important to all who have exhausting labors. It should be taken whenever needed, and a prolonged rest after fatiguing labor. The brain requires abundant nourishment, and is greatly injured by

any exhausting evacuations from skin, kidneys or bowels, or by the waste from excessive labor. Hence, athletes who train to reduce flesh often impair the nervous system. A condition of moderate *embonpoint*, such as we often see in handsome women, is the best condition for the brain,* and this is promoted by the free use of fluids, while abstinence from fluids reduces obesity.

The most signal proof of the relation of nutrition to the integrity of the brain is the restorative effect of generous feeding of the insane in the Pennsylvania Hospital under Dr. John B. Chapin. Although 16 to 20 ounces of solid food are said to sustain the health of a workman, Dr. C. administered in one case 137 ounces daily, making a gain of 29 pounds weight ; in another, 172 ounces, making a gain of 58 pounds ; in another, 154 ounces, with a gain of 42 pounds ; and, in another, 188 ounces, with a gain of 20 pounds. All made good recoveries.

The ultra advocates of temperance and abstinence, who would restrict the pleasures of the table and make the diet monotonous and unattractive until the appetite fails, act on erroneous principles. A blood well enriched by good nourishment is essential to health ; or, in other words, it is essential to a vigorous brain.

The growth of the brain when well nourished, and its decline and absorption when poorly nourished by the blood, are most fully shown by the observations of Malgaigne upon the serous condition of the brain in badly nourished rabbits. Kussmail and Tenner confirm his statement, and say that "in very thin rabbits, the exterior part of whose skull was opened during life, we found very great quantities of serum, and but little blood, whilst the opposite condition was observed to hold in well-fed animals."

In the prostrate attitude on the back, the vital forces are also assisted by the warmth given to the spinal column. This is especially observable when we lie on the back after dinner to assist the process of digestion. Exposure of the back to be unduly cooled is very injurious, and this is apt to occur when patients turn upon the side, exposing the back, which has been accustomed to the great warmth of the bed. The back must be protected from cold winds and cold, wet conditions, and it is the region to which the vitalizing nervaura of another constitution is most efficiently applied.

With a full knowledge of Sarcognomy a complete code of culture and development might be prepared, to guide in the attainment of

* Dr. Meisner investigated the defective vision which occurred in a large body of Russian troops, and ascertained that it was due to defective nutrition, owing to the observance of a Greek fast, and passed away soon after the end of the fast. Nursing women, insufficiently fed, are oftentimes affected in the same way. In starvation the brain power is impaired before the emaciation of the body appears. The gayety of the active brain is most conspicuous in feasting, and social pleasures do not develop in company with hunger.

health and virtue, for which this chapter merely gives the leading ideas.

A French writer, Fernand Lagrange, has discussed the subject of bodily exercise from the common physiological data without arriving at the original views of Mr. Checkley. The writings of the medical profession upon such subjects are sometimes meagre and barren from their narrowness of view, which is only made more unsatisfactory by their pedantic technicality, of which the work of Lagrange is an example. By theoretical reasoning he reaches the conclusion that we should seek relief from mental fatigue only by exercises of an automatic character, which do not exercise the will, because the use of the will taxes the brain.

This is entirely erroneous. Mental fatigue is not best relieved by mere muscular exercise, in which the brain is passive. Such exercise adds to the fatigue of both body and brain. Exercise is beneficial only when it is well sustained by the brain, and therefore pleasant. The exertion of a hunter in pursuit of his game is delightful to him, because sustained by his brain. All exercises sustained by strong impulses, that is, action of the brain, are pleasant and invigorating, but whatever is done without the co-operation of mental impulses becomes fatiguing and unpleasant. If the hunter were required to saw a load of wood or to walk on a treadmill, which would not require much mental action, he would be fatigued by less than half the effort which he would enjoy as a hunter.

The relief of the mental fatigue of the student and business man is effected by bringing into action the portion of the brain opposite or antagonistic to that which has been fatigued. This is the social region. Pleasant, sportive, unintellectual company is just what he needs. If his occupation has been sedentary, active games, sports or dancing is what he requires, and the more his brain is roused by the excitement of his amusements, and the more vigorously he engages in them, the better the result. Hence it appears the doctrine to which Dr. Lagrange's book is devoted is absolutely false.

Active exertion accompanied by vigorous exercise of the whole brain, as when the feelings and courage are intensely active, instead of being debilitating, is the most efficient method of cultivating and developing all our powers, and the gymnasium in which there is the stimulus of social sentiment, rivalry and ambition to excel, is far more beneficial than one in which solitary exercises alone are practised.

The essential principle for all exercises for the improvement of health and character is that they should be animating, and produce a cheerful, happy state of mind. Moreover, they should be sufficiently vigorous to compel active respiration and expansion of the chest.

They should also bring a glow to the surface, and those who do not procure that by exercise should resort to friction with a crash towel or use an occasional Turkish bath.

The principle that exercises for personal improvement must not be merely physical but must include symmetrical activity of the whole brain, especially of its upper posterior part, which is the true hygienic region, is absolutely imperative, and this necessarily includes the action of the upper portion of the chest, which Mr. Checkley has cultivated so successfully. For these reasons I am not partial to the gymnasium, or any arrangement formally designed for exercise on which mere muscular strength may be wasted. For youth the gymnasium is far inferior to the playground, which develops the emotions. We live in a world which requires all the labor of all the people, at least eight hours a day, to make it prosperous; and useful occupation is the normal method of cultivating muscle and brain, — useful occupation in company and for some important purpose, which is obedience to our higher nature, and gives us the interest and pleasure which belong to good acts. Normal industry is better than the gymnasium, and heroic exertion is still better. Many a rheumatic has been suddenly cured by the approach of danger which compelled him to fly for his life.

Heroic energy is superior far to all calm and passionless exercise. The performance of some highly important duty, such as the saving of life, elevates our own life. If we can find anything to call out our enthusiasm, that is the best thing to do. A great aim in life is a sustaining power; and, whatever our position, if we go into the battle of life with an earnest determination to conquer difficulties and perform every duty, that determination will sustain us. We should learn to bring our full will power into whatever we do. By this, invalids have cured diseases that defied medicine, in themselves, and the contagion of a strong will has cured many an invalid.

Excessive muscular culture is not hygienic. The trained athletes who prepare for boxing and running frequently exhaust the nervous system, for the brain and the muscles are antipodal. Impaired vitality and a shortened life are consequences that result from over-training the muscular system. The champion athlete, R. A. Pennell, who held out two hundred pounds with one arm, soon became a physical wreck, and died when he should have been in his prime. The exhaustion of the athlete appears in his brain and lungs — failure of vitality and pulmonary disease — and frequently in heart disease.

The passional region of the base of the brain is especially unfavorable to health and life, when it gets into predominance, — human beings have often died in fits of passion, and Dr. F. L. Oswald de-

scribes the death of a grizzly bear from rage. The bear was caught by Governor Pacheco of California in a hunting expedition. It was seized by the hunters, held by two lariats, and dragged by the horsemen, in spite of its resistance, to a barn, where, being bitten by a wolf-dog, it turned upon him in fury, but, finding himself checked by the double lariats around his body, immediately fell dead.

Evidently the basilar organs and the muscular system are not the most essential to vitality, and women, who are inferior to men in muscle, are superior in longevity, because they maintain a more complete and symmetrical activity of the brain.

Our colleges are beginning to recognize the importance of physical culture, but have scarcely attained the true philosophic conceptions. Neither laborious gymnastics nor trivial varieties of calisthenics are what human development requires. Our leading idea should be the culture of the brain, meaning thereby its upper region, which sustains the brain power and energy of the soul ; and, secondly, the culture of the thorax, giving predominance to its upper half. From these regions life flows out to the entire body and perfects every organ.

What exercises, then, will be most effective for this purpose ? Singing emotional songs is, as I have shown in the " New Education," the most efficient of all means for ethical culture and thoracic as well as cerebral development, and hence this should occupy the first rank in a system of complete culture. It is the very opposite of the system of culture by mere muscular exertion practised by athletes and gymnasts, —a system which does not elevate the character or efficiently promote health and longevity.

Muscular exertion which does not come from the spontaneous overflow of cerebral energy is a tax upon the brain and lowers rather than elevates the constitution. Brain and muscle should act in unison.

As the exercise just mentioned — spirited song — gives the highest activity to the brain and upper thorax, it is manifest that it produces a surplus energy that would delight in physical exertion and therefore should be indulged in action.

I would therefore prescribe for a school of thorough culture an exercise of ten or fifteen minutes, three times a day, consisting of spirited songs associated with spirited action. The arms should be thrown aloft in graceful gestures in various directions, but chiefly the arms and palms being held aloft and thrown up with energy ; then there should be movement of the lower limbs, marking time with the feet and shifting their positions ; then marching with varying rapidity, keeping up the song ; finally a systematic dance, song being still maintained, ending with a dance to instrumental music. This

would produce the most perfect and harmonious development of the entire constitution. The superiority of the results of harmonious and ethical culture over that of the merely muscular is illustrated in the advantage the ethical nature gives to women in making them superior fencers and dancers, though inferior to men in physical development. Mr. Checkley says that at the ballet school the girls were superior to the boys. Women who are trained to work instead of effeminacy are as efficient as men in labor and often superior in endurance. The King of Dahomey has shown that they may be made good soldiers.

Arm gestures are prescribed in calisthenic training, and are made prominent in training cadets at West Point. They are all beneficial, but the gesture without the voice is comparatively a feeble, spiritless affair. All other gestures are unimportant, compared with the upward. This expands the chest, throwing the vital energies upward, and is therefore of a rousing, hygienic nature.

In using the arms we should have a light weight in the hands, of two to four pounds, for brisk movements; and should also have heavy weights, of from six to ten pounds, for the exercise of the shoulders.

Fencing, boxing, rowing, leaping, running, swinging, and a great variety of exercises with ropes, ladders, bars, weights, leaping poles, roller skates, etc., all have their value; but that value is greatly increased when associated with vocal exercises or with music.

Walking with a proper attitude is a very important part of our self-culture. We are continually gaining when we walk with the abdomen held in, the chest prominent, the head erect, and the back also erect, in a line nearly straight.

Mr. Checkley has the utmost confidence in this, as sufficient for our development, without the need of gymnastic apparatus.

To review the whole subject at the risk of repetition I would say that the fundamental principle of hygienic culture is the development of the symmetry of a normal constitution, or, in other words, the culture into activity and predominance of those portions of the constitution which are the source of happiness, health and vital power, and the restraint into subordination of those which tend to feebleness and disease when predominant; in other words, to live in the summit of the brain and the summit of the body.

The regions which thus need special cultivation are the upper half of the brain, the seat of happiness and moral excellence, the upper half of the body, the thorax — especially its upper portion — and the spinal column, the abdominal region being that which needs to be kept within bounds; the muscular system also being cultivated within judicious limits and not allowed too great a develop-

ment. If we seek muscular vigor it should be attained rather by developing the spinal cord or nervous energy than by increasing the size of muscles. A large thorax and strong spine produce the highest efficiency.

The development to be sought is that which comes from functional activity, and the functional activity of the superior organs secures the healthful activity of the whole constitution. Thus we attain the cephalo-thoracic temperament, a development which the world admires; which was seen in Washington, Jackson and Clay, and imperfectly displayed in the Apollo Belvidere.

Pre-eminent among the means of hygienic culture is the culture of the soul; or, in other words, of the upper half of the brain — the culture of a noble character — of firmness, energy, industry and hope, animated and directed by love, benevolence, devotion, faith and sympathy. Perfection of character develops perfection of constitution, and hence the teacher of a true religion develops body as well as soul, and the two functions, religious and therapeutic, should be united in the same individual. The priest should be a physician, the physician should be as far as possible a priest.

It is the characteristic doctrine of Sarcognomy that *religious excellence of character is the best basis for health;* and I say *religious*, rather than *moral*, because the word moral has, from the ethical perversion of society, acquired so cold, cramped and petty a meaning as to be inadequate to the expression of a complete character. It is true the word religion has been equally perverted, so that it fails to express the fulness and completeness of the soul, and does not include some of the most important elements of character (being compatible with austerity, intolerance and asceticism), but it includes, or at least does not ignore, a lofty reverence, spirituality, faith and love, which morality overlooks. Hence I use the word religion as capable of being understood to mean a Divine perfection of character, and I affirm that this Divine perfection is an inspiring force that tends to make the body perfect, fitting it for the residence of a perfect soul. Hence the great power of religious enthusiasm and faith in making marvellous cures of disease, and the power of mind-cure healers in improving health by keeping before the mind a grand ideal and thus bringing our spiritual nature into correlation with Divine perfection.

All social exercises, and amusements in which the social affections are called out, contribute to health, and a life of active labor in the zealous performance of duties gives strength to the nobler qualities which sustain our health. At the same time it is important that in performing these laborious duties we should be surrounded

by social harmony — should be associated with friends. The continual presence of persons who are disagreeable, for whom we feel contempt or aversion, is a continually depressing influence to our higher nature and consequently to our health. Hence the great value of the association of the sexes for the promotion of health and virtue. The strict separation of the sexes produces a decline among men in refinement, virtue and health, as well as an enfeebling, demoralizing influence on the other sex; coarseness on one side, feebleness and imbecility on the other. The conjugal union furnishes the essential condition of spiritual and physical health, in the serenity and love which it produces when it is a normal union. But in the abnormal union — the union of those who have little mutual respect or love — each becomes an injury to the other, and the injury is transmitted to offspring. The dissolution of such debasing unions is therefore essential to health and virtue.

The mental condition which is truly ethical and which we should ever cultivate is that expressed by a smile. The smile (according to Pathognomy) is the expression of the superior regions of the brain, a manifestation of amiability and happiness which instantly rouses a corresponding feeling in the beholder. The smile illuminates the face and changes a repulsive to an attractive expression. The frequent smiles of women make their society attractive and win the love of men. Smiles have many varieties and degrees of merit, but all are attractive and healthful.

As we are continually liable to encountering an unpleasant social as well as physical atmosphere, the cultivation of heroic hardihood should be a leading aim of hygienic culture. He who cannot encounter the exposures incident to our irregular atmosphere without contracting colds, pulmonary inflammations, rheumatism, neuralgia and impaired health, is but poorly developed, and he who cannot meet the unsympathetic, coarse, selfish, half-developed humanity that abounds everywhere, without suffering in mind and realizing irritation, depression, melancholy or misanthropy, is poorly devoloped and needs to overcome his weakness and morbid sensibility.

This heroic hardihood belongs to the shoulders, and is the product of an active life with exposure, — a life in which we must encounter difficulties and perhaps dangers. The lesson that nature teaches most impressively in "the survival of the fittest," is the importance of cultivating firmness and power. Weakness is everywhere victimized, and power everywhere triumphant. In meeting the unpleasant influences of society, the weak man is depressed, discouraged and defeated, the strong man is not affected, and by his superior moral force overcomes the unfriendly influence and makes it subservient.

The saints and heroes that have won the world's admiration have possessed the highest moral strength.

Strength of all kinds comes from exertion of the faculties. Hence *incessant activity* in important undertakings should be the rule of those who seek full development, and this incessant energy coincides, both as cause and effect, with development of the shoulders and upper occiput, and their predominance over the abdominal region and the anterior base of the middle lobe of the brain. When that development is attained it gives the organic basis of a superior character, and until it is attained we should seek it by a life of honorable activity of soul and body. The upper region of the brain furnishes the desires or impelling motives to such a life, and will insure such a career, if sufficiently strong, unless thwarted and repressed in youth. Among the desires that it gives are those which seek honor, friendship, love and distinction, toward which they instinctively lead us, and in doing so develop our constitution to its highest conditions of health, happiness and power, if their impulses are not thwarted. The conjugal union is one of their aims, which is sometimes defeated, but in its absence the frequent association of the sexes under favorable circumstances of good society may become a partial substitute, and there is no form of association more favorable to cultivation of the refining and healthful sentiments than dancing, in which the charm of music is associated with that of grace and courtesy.

The indoor and outdoor sports of boys and girls are of the highest importance to their health, happiness and development when they are guided and inspired by good humor, the malicious, quarrelsome or ill-disposed being excluded. A very simple rule determines their value, for that which promotes enjoyment at the time and furnishes pleasing memories is just what is required for health and virtue, as it develops the upper region of the brain. In youth these enjoyments are of a more playful character, and even mingled with rivalry; but in mature life the consciousness of duties to be performed and of worthy objects being realized becomes the paramount feeling, social pleasures, games and sports being too much neglected. Daily dancing should be the rule at health resorts.

It is essential to health that life should not be a hopeless struggle, and that faithful exertion should be rewarded by security and comfort, — that life should not be a matter of jealous and dangerous strife, tending to anxiety, despair and misanthropy. Brain and body give way under such conditions, which almost paralyze the upper region of the brain. Thackrak, in his work on the influence of trades and professions, refers to the anxiety and mental application of

merchants, professional men, students, etc., as among the leading causes that shorten life, producing disease of the brain, liver, stomach and heart.

The higher regions of the brain are exhausted and paralyzed by many causes, — chiefly by gloom, by hate, by exhaustion and by toil. The lower class of European laborers in the past have had only about half the longevity of the more favored classes. Everywhere we see men and women prematurely old, worn out at fifty, forty or even thirty, from extreme toil of the muscular and intellectual powers, and extreme discouragement, continually exhausting the fountains of life without any proportional action of the upper regions of the brain to enable them to bear such toils, — women bearing the strain better than men because they have constitutionally more activity of the upper brain than men.

The intellectual strain requires to be balanced by social enjoyment and sleep; the physical strain by the higher region of the brain, — the strong, delightful emotions and energies which sustain us in toil and give us prompt recuperation when it is over. These higher faculties give to the whole constitution an elastic energy and inspiration which constitute personal superiority and physiological perfection, the superiority of the men who lead in every department. I do not mean that the leaders of society are always the best men, for leadership is often a matter of wealth or accident or animal force; but that their superiority depends on that portion of the upper brain which corresponds with the shoulders and arms and upper portion of the chest.

If, therefore, any system of exercises can be arranged which shall develop the brain, the shoulders and upper portion of the chest, such a system should be faithfully cultivated.

Pre-eminent among these exercises is vocal culture. Even the use of the lungs in blowing musical instruments has proved very beneficial to health and pulmonary development, and the exercise of newsboys in crying their papers cultivates their manhood most efficiently. Singing ranks highest as a hygienic and ethical exercise, but declamation takes the lead of all set exercises for general invigoration and shows its happy effects in leading actors. Lecturing may be made a very superior exercise if rightly conducted, but if made a mere exercise of intellect and animal force it becomes fatiguing, like business affairs, as it uses the anterior and the basilar regions of the brain. But true oratory, which uses the whole brain, and especially its superior regions, to charm, to elevate and to win, is the noblest exercise possible, developing everything admirable in the orator, perfecting his manly power, health and happiness, and

leaving an ennobling influence upon his hearers. There, is however, an inferior style of oratory, based upon loquacity, animal force and animal magnetism, which is not ennobling either to speaker or hearer, as it does not use the higher powers. It may invigorate or stimulate the animal force of the speaker, but it does little good to the hearer.

To attain the best results of oratory there must not be any intellectual toil, or an extreme intellectual profundity and discussion of abstract themes, which would give it the character of lecturing. The theme should be as familiar as possible, or else the language fully committed to memory, and the subjects of a strongly emotional character — themes that call forth deep feeling and a profound sense of duty. When the orator rises to heroism, as in the appeals of Patrick Henry or the discourse of a religious apostle willing to lose his life to save his fellow men, we have the noblest influence to which human nature can be subjected.

A lecturer who understands these principles and applies them will continually improve himself by lecturing, while another may exhaust himself, impair his health, and find it necessary to suspend his duties.

The same principles apply to the regulation of our conversation. It may be so conducted as to exhaust or to refresh our vital forces.

The hygienic principles of Sarcognomy (especially the proper predominance of thoracic over abdominal development) have been so forcibly and practically illustrated by Mr. E. Checkley, who has just published a work on the subject, that I addressed him the following note, to which his reply is quite instructive.

6 JAMES STREET, BOSTON, March 20.

MR. CHECKLEY:

Dear Sir, — The matters on which I would like to hear from you are: —

1. What evidence can you present of the inferiority and morbid tendencies of persons in whom the abdominal is developed more than the thoracic?

2. What are the morbid tendencies produced by drooping shoulders and narrow chest?

3. What evidence of the evil effects of too much diaphragmatic breathing in place of costal?

4. What improvement in the brain power, *moral nature*, health, muscular vigor, *symmetry* of person and longevity have been attained by cultivating the upper part of the thorax, and what change of conformation can be produced by one or two months of hygienic practice.

Yours cordially,

J. R. BUCHANAN.

111 RUTLEDGE STREET, BROOKLYN, March, 1890.

DR. J. R. BUCHANAN:

Dear Sir, — In answer to your questions of the 2d March, I can only give you my impressions gained from practical experience and observations carried on for more than ten years. In relation to the abdominal versus the thoracic regions, my verdict must always be in favor of the thoracic. In my practice and teachings I repress the one and bring out the other; but I will state that, in so far as I can at present prove, I find two extremes of abdominal culturists that present two totally different characteristics. The first are those who have large abdomens, with flat and usually hollow chests, and heads seeming to protrude outwards and forwards from the body instead of upwards; muscles soft and small, with adipose tissue flabby; and limbs thin in proportion to what one would expect to see in a person with such a large waist.

The second have the adipose tissue firmer and more evenly distributed, with, of course, a large abdomen; thick, firm necks; head seems to be thrown back as well as the body. While I am at present not well able to state certainties, my knowledge up to the present time points to the following characteristics as belonging to the different extremes of abdominal culturists. The former I find of sedentary habits, of a physically lazy disposition, philosophic ideas, morbid fancies that tend toward suicidal mania, and generally of weak and cowardly natures. The latter are generally of a strong animal nature, with all that that implies; practical in the extreme (in fact, I have never seen what I would term an idealist in mind among them); of a firm, forceful will and dominant disposition; and fond of the table.

These are, of course, two extreme types; but the many grades between them one can readily judge who has had any experience. This I can state of a certainty, that those whom I have met with who were possessed of a large costal development are proud, idealistic, brave, energetic, and of a high moral nature.

The more I have seen that part developed, the more these characteristics are shown; the very position and carriage of the body makes them so.

Of the second question, I find they are what I call general hypochondriacs, who always think they have some disease; suspicious, irritable and cowardly, as well as physically weak.

Of the third question, diaphragmatic breathing I believe to be one of the worst evils of so-called physical educators. It weakens the diaphragm instead of strengthening it, makes the muscles of the abdomen weak, and leaves the person liable to rupture. I call this

muscle the girder of the lower ribs. The evidence of those I have had under my care who previously had practised it proves that they were subject to constipation, and I noticed all who claim to have practised this method of breathing were physically weak, circulation poor, subject to giddiness, and in some cases to palpitation of the heart.

The abdomen should never be expanded in any action, it should always contract. I do not believe it has anything directly to do with breathing, its movement is purely sympathetic. I never use it in any action, breathing or otherwise, only, of course, to contract it.

The lower ribs should be the smallest diameter of the chest. I strongly condemn the practice of diaphragmatic breathing.

Of question four. — In answer to the first part I cannot help but make this assertion about myself: I do not believe that I should ever have been even of ordinary intelligence only for my physical powers. And all of those who practise under my tuition say that they think clearer and feel more sure of themselves in what they undertake to do; and, as far as health is concerned, one patient, a gentleman 51 years of age, after two months' treatment of one hour a week, said, in answer to a query as to how he felt about his work: "Work" (he made answer), "I don't do any work; it's all pleasure." "Why, how is that?" remarked his friend. "Well," he said, "I go and see Mr. Checkley every week, and this feeling is the result of his treatment." He was refused insurance on his life; they said he had Bright's disease of the kidneys. He has not got it now, I am positive, as his urine has been examined by the best expert in the country. He came to me only as a last resort, for he said he had tried everything.

Muscular vigor and symmetry I shall write of in citing cases. Longevity I cannot speak of, as I have not either practised or lived long enough to know; but, from the way I feel myself, at the age of 36 years, I feel as though I would live forever. I enjoy life; I firmly believe, barring accidents, that I shall live till I reach 100 years easily. Old Dr. Gross once examined me, and he said that if I kept on the way I was then I ought not to retire from work till I reached 90 years. The rest you must judge from measurements and cases cited below. The moral nature I cannot speak of, only in a general way. I believe it improves under true thoracic development.

Case A. — Male, aged 54, American, height five feet five and a half inches, chest around line of nipples thirty-five inches, normal expansion of waist thirty-seven inches, no contraction, slight palsy of facial muscles, physically weak, palpitation of the heart, inclined to paralysis

and suffering with chronic liver complaint and catarrh of stomach, could not ride in elevated train, subject to slight lateral curvature of spine, left shoulder an inch and a half higher than the right and curved forward, breath of foul odor.

In two months: height five feet six inches, chest thirty-six inches, expansion to thirty-eight inches, abdomen thirty-four inches, contracted to thirty-one inches, no palpitation, no facial palsy, gave up medicine, shoulders nearly even, spine nearly straight, walked eight miles, breath greatly changed, no need of purgatives, strength more than doubled.

This patient now is five feet six and a half inches high, chest thirty-eight inches, expansion forty-one inches, waist thirty-one inches, contracts to twenty-eight inches, rides in elevated cars without discomfort, can put hands on floor without bending legs, odor in breath all gone, flesh is fairly firm, can pull himself up on a bar to chin eight times. Mind, he does not practise these things, they are only a result of treatment.

Case B. — Age 51, American, male; complaint, obesity and Bright's disease of kidneys; height about five feet seven inches, chest forty-three and three-fourths inches, waist forty-four and a half inches, no contraction.

In six weeks: chest forty-one inches, expansion to forty-three inches, waist thirty-nine inches, contracts to thirty-seven inches. Loss in hips and waist was nine inches.

This case is noticeable in that the disease of the kidneys has entirely disappeared, and for the first time in three years he can put on his own shoes. His measurements after four months' practice are: chest forty inches, expansion forty-three inches, waist thirty-seven inches, contracts to thirty-one inches. And suffers with no constipation; was greatly troubled with that before. Occupation sedentary.

Another case is that of a female aged 22; American; of a weak, nervous disposition; no physical strength whatever; in fact, had to give up occupation; suffered with great lassitude; no mammæ; chest flat and hollow. In two months she had increased the bust measurement five inches. I was astonished. The expansion is three and a half inches. The mammæ grew rapidly. She took no exercise except the respiratory ones and carrying the body properly on the hips. The change was wonderful, both mentally and physically. She told me, the last time I saw her, that she had walked five miles the day before and did not feel the slightest fatigue.

Another contrast is that the patients represented two extremes: one was stout, obese and heavy, and the other was emaciated, weak and thin. Both commenced treatment at the same time and took

the same course. The thin man was a mechanic; and the stout man a merchant, doing no laborious work. In three weeks the obese man lost six inches around the hips and waist, one inch around the chest, four inches around the waist, one inch around each thigh, two inches around the hips, and had lost five pounds in weight. The thin man gained an inch around the chest, one inch in neck, one inch around shoulders, one and a half inches around hips, half an inch around upper right arm, three-fourths of an inch around the upper left arm and gained seven pounds in weight. The color in his face had changed noticeably.

I could send you many more of such cases, but I think that these will convince you that what I asserted to you when I last saw you, that physical ignorance is the cause of more disease, more crime, than even whiskey, rum, or, in fact, all of the vices human nature is prone to commit. Drunkenness and immorality, in my opinion, are not causes; they are but effects. The cause lies principally in the want of an education that even children can learn as well as the most ignorant, — one which will teach us how to know ourselves in a simple practical way, so that the sense of smell becomes more acute as well as that of sight and hearing and the power to intuitively know what is good for us grows the more we understand ourselves. In fact, a person physically perfect has no pernicious habit. To leave off smoking is no effort; dram-drinking is the same. They feel no need for stimulants; in fact, their life flows on like a calm.

EDWIN CHECKLEY.

To a reporter of the *New York World* Mr. Checkley said: —

"'The great defect in modern physical training is that most of the effort is directed to growing large, hard muscles on a man. What good does that do him? He can make a violent effort for a minute, say, but he can't sustain a long trial of strength. And why? Because his breathing powers have not been properly trained. That sounds revolutionary, but you'll find it's true. I claim that if a man ever masters thoroughly the art of breathing he can make himself wonderfully strong. To do this no apparatus is needed save that which nature has given to all of us, and it can be practised at home, on the street, at your desk — anywhere. You have seen some hundreds of champion athletes. How many of them bear any resemblance to the Farnese Hercules? Even the champion vaulters, weight-throwers, runners, swimmers and boxers fall far short of that standard of strength and grace.'

"To show the reporter that the muscle was there for business and not for play, Mr. Checkley balanced and put up a club weighing one

hundred pounds. He did this with his right hand. He lay on the floor and spread his arms so that the hands, palms upward, lay far behind and on each side of his head. The writer, who weighs one hundred and seventy pounds in his shirt-sleeves, stood with one foot in each of the outstretched hands, and Mr. Checkley lifted him high in the air and balanced him over his head. If anybody thinks this is easy let him try it with one-sixth as much weight, and he will soon change his mind.

"'I weigh one hundred and twenty pounds,' he said, 'and I can get down to one hundred and sixteen. Just to demonstrate that my strength was not artificial but practical, I recently quit my studies in the Long Island College Hospital and went to work for eleven days as one of a gang of 'longshoremen. A friend got me a job among a lot of big hustlers unloading ships. The work was chiefly dragging heavy bags of stuff out of a hot, foul-smelling ship's hold. I had done no especial training previous to taking hold of the work, but I found it didn't bother me.

"'In fact, just to test my staying powers, I kept at work eight hours a day, while the trained men around me worked only three hours at a time. It didn't bother me a bit. And yet I am only a sample of what an ordinary little man can do if he will follow my system. I do not believe in the old-fashioned dieting scheme as it used to be applied to pugilists, wrestlers and athletes generally. Any good, wholesome food, not fancifully cooked or gluttonously eaten, will do.

"'I will guarantee that any young man in ordinary health can by practising my system of breathing for one hour a day increase his chest measurement at least an inch the first month and keep up a proportionate growth afterwards. By this system alone I have cured many elderly men of obesity, increased their breathing power and strengthened their muscular system generally, so that they are far better men physically than they ever were before. And all this without using a dumb-bell or any artificial apparatus.'"

There is another important principle in Sarcognomy to guide our hygienic practice — the close sympathy of the entire surface of the body and entire surface of the brain, which makes the treatment of the skin a matter of importance. Warmth and circulation in the skin of any part of the surface promotes the action of the corresponding part of the brain. Hence by stimulating the skin to healthy action we promote the healthy action of the brain and improve our entire condition.

What may be done by baths is too extensive a subject for discussion here, but friction is so easily applied and so very beneficial as to

require notice. With two yards of crash towel one may give himself a thorough friction over the whole body from two to six minutes when going to bed and repeat it in the morning when he rises. He may assist the process by going over the body with a wet crash towel or mitten, applying dry friction to each part immediately after the wet. The exercise involved will also be very beneficial.

Next to this refreshing stimulus must be regarded the stimulus of clean, pure clothing to absorb the emanations of the skin. Cotton clothing retains too much of the exhalations, and ought to be changed daily. It need not be washed as often as changed, but daily change is a great promoter to health. If the bed sheets are not daily changed they should at least be exposed to the air all day instead of being kept on the bed. Cotton sheets saturated with human transpiration are very unwholesome.

Woollen does not retain and accumulate transpiration like cotton and may therefore be used longer. It gently stimulates the skin, but to some persons the stimulation is too great. It gives free passage to the transpiration, and therefore I regard the German movement for woollen underclothing and bedding as an important hygienic improvement.

Tight lacing to produce a narrow waist has been a subject of monotonous denunciation for a long time. The hygienic writers seem to ignore the difference of the male and female constitutions. The selfish and irritable elements of the brain are represented at the waist. These are so much larger in men, and the waist so much more conspicuous, that a circumference of waist belt which would be agreeable to a woman would be very oppressive to a man, being a great interference with his natural conformation. A masculine waist of thirty-six inches is not uncommon, but many women have waists of from twenty to sixteen inches, and some are even less. They are entirely comfortable in their corsets, with waists so slender that male observers suppose them to be greatly compressed. A lady correspondent of a medical journal speaks of wearing corsets very comfortably which measure fourteen inches round, while her bust measurement is thirty-seven inches.

The region compressed in tight lacing is not like the upper part of the thorax, the seat of the most important vital powers; on the contrary, its influence on temperament is rather lowering. Compression of any part of the abdomen is a bracing influence to the general constitution, and the strongest objection to tight lacing is that it substitutes a mechanical support for the natural action of the muscles that compress the abdomen, and thus debilitates the muscles, besides forcing the abdominal viscera downwards, which is certainly

injurious. No doubt corset compression is injurious, but the magnitude of the evil has been greatly exaggerated. In compressing the waist it exaggerates the peculiarity of the female constitution, which does not need exaggeration, and by forcing the viscera downward it oppresses the pelvis and thus greatly increases the depression and disease from which women suffer.

Thoracic Hygiene. — Sarcognomy, by showing the importance of the lungs and thorax, enforces the importance of atmospheric conditions, not only as to proper lightness of the atmosphere but as to its purity and electric conditions, and teaches us to exercise the utmost vigilance in observing the condition of the air that we breathe. Terrible epidemics are continually spread by atmospheric conditions which mankind have not learned to observe and understand. In fashionable dwellings, as well as hospitals and malarious localities, I often observe conditions of the air which are highly objectionable but apparently unnoticed by residents. There is also a depressing negative condition, produced by the absence of sunshine, by evaporation from moist surfaces, and by the thawing of ice or snow, which is oppressive to the lungs. This is realized on the coast of New England, from the influence of Atlantic icebergs, and on the lake shores when the ice is beginning to disappear.

The most striking illustration of the effect of cold evaporation from sunless surfaces of solids is in the fact that it is dangerous to sleep in an apartment which has recently been plastered and is not yet dry. Another danger to the lungs is from a heterogeneous condition of the air, — streaks of cold air being mingled with the warm, as when cold air blows into a room through a crack or narrow space. This often results in what is called catching cold.

The lungs have an important relation to the limbs. Cold applied to the limbs tends to congest and debilitate the lungs, for the limbs have a tonic and correlative relation with the lungs like that of the occipital to the frontal organs of the brain. It is easy to produce pulmonary disease by a current of cold air against the ankles and legs. The entire surfaces of the limbs therefore need protection to protect the lungs, and the same remark is applicable to the upper surface of the back.

The stomach has heretofore been almost the sole channel for medication, but the lungs are equally available, not only by special inhalation of vapors and electrified air, but by remedies evaporated by heat and diffused in the air of apartments.

CHAPTER XX.

SYNOPSIS OF PRACTICAL RULES FOR THERAPEUTIC TREATMENT.

With supplementary suggestions as to the spinal column, ganglionic nerves, anatomy of the thorax, and relation of the limbs to the trunk.

I now present, in very concise statement, the rules to be observed in nervauric and electric therapeutics, by showing what localities are to be stimulated or repressed for various purposes. The organs mentioned will be found on the charts of the head and body. The reader will understand that stimulation is effected by the application of the hands, by gentle percussion, by the negative pole of a primary, a Galvanic, or a Faradic current, by stimulating plasters or embrocations, by heat and in some cases by friction.

Repression is effected by dispersive passes, by the positive pole, by cold steadily applied for a long time, by hot water briefly applied, by evaporating liquids and by medical sedatives.

The localities referred to and the directions will serve to guide all external treatment, by clothing, by plasters, by baths and by the pneumatic or vacuum treatment. Warm clothing applied on any part of the body develops the local influence according to Sarcognomy, and variations of the clothing produce important effects, as cold produces repression.

The first rule of practice is to dissipate the existing morbid condition before we do anything else.

If this is done by the hands, the operator should be in a pleasant, healthy, vigorous condition, neither fatigued, hungry, thirsty, nor depressed in spirits. His blood should be in a plethoric condition. Drinking freely of nutritious and stimulating liquids assists him to operate vigorously and to repel rather than absorb disease. He should not be passive in his intercourse with a patient, which would render him impressible by morbid conditions, but should maintain incessant activity and a positive state of mind.

The dispersion of morbid conditions is effected by rapid dispersive passes with the hands, as if we were brushing out a fluid. The fluid exists, which we call nervaura, which is morbid in morbid parts. It

is moved in the direction of our manipulations. We may thus disperse a pain at one spot and find it reappear at the part to which we have moved it. Thus we may transfer morbid conditions from one part to another in contact, and from one patient to another, or to ourselves. The dispersive manipulation carries the morbid condition, and an electric current does it still more effectively.

Hence it is indispensable that the current of morbific influence should not be conducted into ourselves, and that it should be carried out of the body of the patient. The dispersive passes should drive it entirely out of the patient by his feet and hands, especially the former. It may pass into the atmosphere, but it will pass more readily into water, by placing the feet in water or on a wet sponge, or by manipulating with a wet sponge or cloth, or wet hands.

The relief by manipulation with the hands is generally prompt, constituting a large part of the cure, and sometimes completing it. It is also effectually given by an electric current applied by a large wet sponge on the morbid part and passed down to a similar sponge or basin of water under the feet. Yet even this should be preceded by a dispersive movement with the hands, the efficiency of which cannot be surpassed by anything else.

The dispersive current may be either the galvanic, the primary or the static, the positive pole being on the morbid part.

After the morbific influence has been dispersed, the morbid part is to be invigorated by the application of the hands on the spot, and on those parts of the spine and the head from which its vital energy proceeds. The application of the hands on the body is made more effective by a gentle percussion for a few minutes, which may be made vigorously upon robust persons.

As the vital forces belong to the posterior half of the body and the brain, the greater portion of our treatment is applied on the posterior surfaces, and the currents from manipulation and electricity are generally directed backwards. As vitality proceeds from above downwards electric currents and manipulations should be upward rather than downward. The common notion about electro-therapeutics, that currents should be sent in the directions of the nerves to their extremities, would imply that we should stimulate the organs at the expense of the central nervous power, which would be reduced by centrifugal currents but stimulated by the centripetal. While moderate centripetal currents are more often beneficial than the opposite, reciprocating currents, which operate both centripetally and centrifugally, have perhaps a wider sphere of utility. Let us now consider the various methods of treatment to accomplish special purposes.

1. *To establish health.* Stimulate Health, repress Disease on the

body and the head. Disperse excitement from morbid organs, and reinforce them by the hands. Rouse all inactive functions and repress those in excess.

2. *To promote mental soundness.* Stimulate Sanity and Cheerfulness, and the entire summit of the trunk — the shoulders and upper surface of the chest. Repress Insanity, Melancholy, Disease, Irritability and Excitability.

3. *To promote mental vigor.* Stimulate the cephalic zone of head and body. For the psychometric clairvoyant and spiritual faculties, stimulate at the lower end of the sternum — for Oratory at the five upper dorsal vertebræ and the posterior surface of the shoulder joints, also the region of Inspiration on the lateral surface of the chest. On the head — Oratory is on the upper occiput, Clairvoyance at the root of the nose, Psychometry in the sensitive region of the temples and the intuitive region at the part of the front lobe which is behind the root of the nose.

4. *To produce sleep.* Stimulate from the sternum to the umbilicus or on the cerebral organ of Somnolence — then on the organ of Sleep on the body and head, assisting if necessary by the front of the leg and foot, which are very sedative. Somnolence and Sleep or Repose may be stimulated simultaneously on the body and on the head.

5. *To promote wakefulness.* Stimulate the middle of the forehead, and the perceptive organs of the brow, especially Light — disperse upward and backward from the temples. Stimulate upper dorsal region, upper occiput, shoulders and thighs — disperse from the whole front of the abdomen, inguinal and pubic regions, and from the region under the jaw.

6. *To relieve headache.* Brush rapidly downward along the jugular veins and the back of the neck ; brush upward and backward from the temples, and backward on the median line. Make dispersive passes at the seat of the pain. If the head is cool stimulate the cephalic zone — if hot, the front of the leg and top of the foot. Also apply hot water freely to the head. Manipulations on the neck alone usually relieve headache in five minutes or less.

7. *To invigorate the lower limbs.* Stimulate occipital base of brain and neck, lumbar and sacral regions of back, entire thighs and calves of legs.

8. *To overcome pneumonia* and other conditions in which there is hyperæmia, warmth, irritation or congestion in the chest. Stimulate pulmonic portion of dorsal region (between the shoulders) and tibial surface of the leg (aquatic region) including top of foot. Use dispersive passes or electric currents from front of chest toward feet and hands. For prompt effects use hemastasis, by applying ligatures

around the shoulders and thighs, which will be more effective if the legs and forearms are inserted in warm water or stimulated with mustard. Keep the limbs distended with blood several hours. Apply Hæmospasia as directed in Chapter 14.

9. *To overcome asthmatic*, or dry and constricted conditions of the lungs — stimulate inspiration on the chest and the pulmonic region on the back.

10. *To overcome excitability* of the heart. Stimulate the entire shoulder and the middle of the dorsal region, also Firmness and the upper occipital region of the head, dispersing from the temples.

11. *To deepen respiration.* Stimulate on the abdomen below the umbilicus, and on the face below the mouth. For expansion of the chest by costal respiration — stimulate Inspiration on the ribs, the upper dorsal region, and the thoracic or pulmonic region in the temples. Stimulate Health to co-operate. The most effective impression on the diaphragm is made by an electric current from the lower cervical vertebræ to the respiratory location, two inches below the umbilicus.

12. *To promote the healthy action of the stomach.* Stimulate the lower dorsal region and the gastric location just below the ribs (Alimentiveness) in connection with Health. The region of Assimilation just above the umbilicus will assist.

13. *General invigoration* is produced by stimulating the base of the brain through the neck, the summit of the dorsal region, the shoulders generally, and the upper occipital region. Stimulation upon the back of the neck not only rouses the base of the brain but reaches to the three cervical ganglia which stimulate the heart and the circulation of the brain and spinal cord. These ganglia are opposite the third, fifth, and seventh cervical vertebræ. From the lower portion of the neck proceed the nerves that give power to the arms, and the arms sympathize with the invigorating regions of the occiput. The central location for producing the maximum vigor of the constitution is at the summit of the dorsal vertebræ, and the corresponding spot on the head is at the posterior margin of Firmness — a locality which recent vivisecting physiologists consider the source of vigor to the lower limbs and which they call the posterior parietal lobule, or superior parietal lobule.

14. *To overcome constipation.* Stimulate the region of Defecation on the abdomen (lower end of Gastro-enteric region) and the entire lumbar region ; or pass mild Faradic currents between these two locations, or alternating primary currents. Currents passed through the lower lumbar vertebræ reach the aortic and hypogastric plexuses which send nerves to the descending colon, rectum, bladder and sexual organs.

15. *To overcome menorrhagia and dysmenorrhœa.* Make rapid dispersive passes from the groin upward and backward, and downward if necessary; stimulate the lumbo-sacral junction, and the location of Cheerfulness, Sanity and Chastity near the axilla, with the hand or the negative pole, the positive being on the groin.

16. *To overcome insanity,* in any of its forms of mania, dementia, etc., the pelvic organs should be restored to health and all serious affections in the region of the liver and stomach relieved; then primary or Galvanic currents for ten, twenty or in some cases even thirty minutes, should be passed from the perineum to the region of Sanity at the axillæ, on each side — also to Health and the cephalic or upper dorsal region. Very gentle currents may also be passed from the under-jaw region of Insanity to the cerebral locations of Sanity and Firmness, or the latter may be stimulated by the hand, and the former subdued by dispersive passes on the side and back of the neck. When there is violent excitement and over-active circulation in the head, a stream of hot water applied to the disturbing regions on the side and back of the neck, along the carotid and vertebral arteries, will have a beneficial influence. Cerebral excitement may also be subdued by an electric current from the under-jaw region to the feet.

17. *To relieve hysteria.* Use dispersive passes or electric currents, from the location of the womb to the region of Sanity at the axilla, and stimulate the region of Health at the top of the shoulder and the summit of the dorsal vertebræ.

18. *To treat organic diseases of the womb.* Remove excitability as in hysteria; use suitable medical injections, such as Helonias, Hydrastis, White Pond Lily (Nymphœa odorata) and Bromide of Ammonium, and apply the positive pole to the cervex, sending a current to the lumbar region or to the axilla. In the first treatment a dispersive current may be sent from over the womb to the feet.

19. *To control nausea.* Nauseating substances sometimes require to be removed by an emetic or by a gentle, soothing cathartic. Medicinally, nausea has been resisted by soothing aromatics such as peppermint water and minute fractions of a grain of morphine, or by ingluvin and lactopeptin, which assist digestion, or by minute portions of lobelia or ipecac, which act homœopathically. To treat nausea and vomiting according to Sarcognomy, relief should be given by dispersion from the seats of Nausea and Disease on the body. In slight cases vigorous dispersive upward passes from Disease, and stimulation of Health and the lower dorsal region will restore the stomach to a comfortable condition. In such cases a primary current from Disease to Health is beneficial, and relief has sometimes been given

by a Galvanic current at the locality of the stomach from left to right, aided by the application of atropia or of belladonna on the surface. Dr. LeConiat claims to have relieved seasickness by applying the negative pole near the pyloric end of the stomach, and passing the positive over the surface from the cardiac to the pyloric end after moistening the skin with a solution of sulphate of atropia, the active element of belladonna. But this treatment is rather palliative than radical. The radical treatment must reach the sacro-iliac region of Nausea or Disgust, though it may be assisted by hypochondriac and epigastric treatment. Thorough dispersive treatment should be applied at Nausea, and the electric current introduced at that location and conducted to the shoulder, where the negative pole may be applied on the top, back and front of that region, over the entire space between the lower angle of the scapula and the nipple. With the highly sensitive, the nervauric manipulation would be equally effective—stimulating the upper region just mentioned, and dispersing from the lower. The horizontal position of the body favors the predominance of the upper region, and it would even be advantageous if the head of the couch were a little lower than the foot, and if the shoulders and arms were kept especially warm. The application of hot water freely to the corporeal seat of nausea, or to its cephalic seat (the posterior surface of the cerebellum), is very beneficial, and a similar result may be attained by the application of ice or by the coolness resulting from the evaporation of ether. Whatever stimulates the upper region of the brain tends to overcome nausea; hence champagne, coffee and caffeine (Bromo-caffeine) have been beneficially used. Whatever diminishes the excitability of the pelvic region is beneficial against nausea; and it is for this reason that the bromides have been effectual.

The neck of the womb appears to be a centre of nausea. The development of a uterine tumor has been known to produce nausea and vomiting. The nausea of early pregnancy, before the womb has developed sufficiently to rise above the region of nausea, is a familiar fact and is treated like the nausea of seasickness. It is developed by the downward pressure on rising in the morning (and hence called morning sickness) as seasickness is developed by the downward impulse of the abdominal viscera, and like that is relieved by remedies which send the vital forces upwards. Prof. E. D. Mayo found a cup of coffee or a glass of champagne taken before rising a relief to the morning nausea. Similar relief has been given by a cup of tea or a bitter infusion or effervescing drinks or a breakfast taken in bed a while before rising. Relief has also been given by a little cocaine, or by a little veratrum viride applied to the neck of the womb. Thus it is clear that a region opposite the sacro-iliac symphysis is the seat

of nausea, and that it must be treated by measures which divert from the pelvis toward the thorax.

20. *Phthisis pulmonalis*, or tuberculous consumption, is a disease dependent on inferiority in the blood and the vital forces. When not too far advanced, it may be controlled and cured in the very impressible with very little use of medicine; but in all others medical treatment must be the chief reliance. The fundamental rules of all treatment are to diminish the irritation of the lungs, promote a healthy expectoration, increase the muscular energy, increase the digestive and assimilative power, and develop the largest possible amount of healthy red blood. Hence, in the early stages an active, hardy, outdoor life, developing a vigorous appetite and satisfying it with rich nitrogenous food (especially flesh) has often wrought a perfect cure.

In the nervauric treatment, the irritation of the lungs must be relieved by dispersive passes to the hands and feet, and by stimulating the aquatic or tibial region, which overcomes pulmonary irritation. The lower dorsal region should be stimulated to promote digestion; the shoulders or Health region, and the space between them, to invigorate the lungs; Vital Force and Nutrition to resist debility and emaciation, and the upper and lower limbs should be stimulated to assist them in active daily exercise. Treatment should be given to the entire posterior surface of the body. An active life in the open air and sunshine and the most generous sustaining diet that can be digested are necessary.

As animal food nourishes the blood more rapidly than anything else, cures have been made by dieting on beef largely consumed. A little iron especially (the phosphate of iron and phosphate of lime) assists in restoration of rich blood, which is indispensable to recovery. Exercise of the upper and lower limbs to promote expansion of the lungs is necessary. Electric currents through the lungs to the posterior surface of the chest are an essential part of the treatment. A gentle reciprocating current between the mammæ and the region of Health will be of great benefit.

21. *Pericarditis* and other inflammations of the heart require the tranquillizing and tonic influence of Firmness, Patience, Fortitude and Heroism, located at and near the sagittal suture or median line of the head, and on the body at the top of the shoulder. The exterior and upper part of the shoulder gives Heroism or Hardihood and interiorly at the base of the neck we find Patience and Serenity which overcomes all excitability and irritation. We get additional vigor for the heart as we descend on the shoulder blade and also on the spinal column, between the shoulders. In addition to these quiet tonic influences, by which we produce a slower and steadier pulse, we need

the antiphlogistic influence of the tibial or aquatic region, which is the proper reliance for resisting inflammatory diseases. Under these two influences the inflammation, pain, excitement and oppression are relieved, and nature displays its restorative power. As there is usually considerable heat or fever, this would require in addition to the aquatic influence that of COOLNESS, on the side of the body and on the head, which directly resists the fever.

We should not forget that the first thing to be done in this, as in other active local affections, is to disperse the local morbid influence. Dispersive passes upward and backward over the heart toward the shoulder and spine should be our first ministration and should be repeated as often as the symptoms indicate the need. Dispersive passes should be made from the cheek-bone and the temporal region near the ear toward Health and Firmness. By such passes alone I have completely relieved the heart in a case of pericarditis.

22. *Dilation* of the heart — a condition of debility, recognized by the feeble circulation, oppression at the heart, weakness of its impulse and the increased extent of its sound in the chest — requires perseverance in a tonic treatment through the shoulders, the upper dorsal region and the thighs to produce the same results attained in the medical treatment by the use of Cereus, Convallaria and Digitalis which are necessary in such cases. The Cereus Grandiflora or Bonplandii and the Convallaria I should consider indispensable, but they do not supersede the necessity of nervauric treatment for the impressible. The whole posterior surface of the body and the head should be treated.

23. *Affections of the liver* should be treated adjacent to its location, bearing in mind that we impart energy through the posterior surfaces. Hence when we apply the hand on the lower dorsal vertebræ we energize the liver. Passing forward on the side of the trunk, the influence becomes more exciting and less tonic. In its congested and irritated conditions, dispersive passes from the front to the back are appropriate, together with the stimulation of the lower dorsal region and the shoulders. In inflammatory conditions, the region of Coolness and the tibial region have a good influence. We stimulate the liver on the hepatic zone of the brain, producing the most energetic effect about two inches behind the ear.

24. *Affections of the stomach* are treated at the lower dorsal vertebræ and at the gastric location on the abdomen below the ribs — also on the assimilative region above the umbilicus — the shoulders being used to control the excitement and give it a healthy direction. From the lower six dorsal vertebræ, ganglionic nerves proceed to the solar plexus which supplies all the abdominal viscera. The solar

plexus may be reached directly through the lower dorsal vertebræ. Dispersive currents from the front relieve morbid conditions, and reciprocating currents between the front and back give vigor to the stomach.

25. *All irritations of the abdominal organs* are treated with dispersive passes backwards and upwards — the lower dorsal and lumbar regions being used to vitalize, and the shoulders to control, regulate and moderate the action. They may also be relieved by dispersive passes downwards to the feet and electric currents in that direction.

26. *Fevers* require efficient dispersion from the hypochondriac and hypogastric regions (Disease and Calorification) and the stimulation of Health and Coolness — and of the tibial region when the brain and nervous system are excited. Currents of warm or hot water upon the region of Calorification are an efficient febrifuge. The same end might be attained, but I think less beneficially, by currents of cold water upon the hypogastric region of Calorification. The practice has been successfully tried in Germany of reducing the temperature in typhoid fever by free and prolonged injections of water into the rectum, fully twenty or more degrees below the temperature of the patient. Water applied to the legs and the forearms would be very efficient in reducing the temperature, for these parts have a very close sympathy with the abdominal organs. This practice is much more easy and pleasant.

27. *Chills* require the excitement of Calorification, Health, the lumbar region and the thighs. Reciprocal currents between the lumbar and hypogastric regions efficiently raise the temperature.

28. *Inflammations* or inflammatory diseases require the influence of Coolness, the tibial region and the top of the shoulder. The first counteracts inflammatory heat and fever, the second diminishes capacity for inflammation, and the third diminishes sensitive excitability and sustains the vital energy. They are also efficiently treated locally by dispersive passes or by currents of positive electricity sent through to some proper location, such as the tibial region or Coolness, or Health. Dr. Gale (1802), in treating the urinary organs by electric currents, was asked by his patients if they did not produce the internal fever they felt. Such currents between the kidneys and bladder involve the region of Calorification.

The hypogastric region, in which the calorific and sexual functions reside, is one of intense sensibility and great control over vitality. We have a case recorded of immediate death in a married woman produced by the shock of an injection of cold water against the mouth of the womb with the intention of producing abortion.

Irritations of the urethra have very serious consequences. The

Weekly Medical Review says: "About middle life in men perfectly healthy, or with no discoverable evidence of disease, except perhaps, and even that not always, a low density of urine, the commencement of habitual use of the catheter is sometimes followed by fever of the remittent type, which often ends in death, and that for the fatal issue in such cases no adequate structural explanation can be found. It is important that such a fever, arising in the midst of apparent health from such a seemingly small cause, and leading so often (as it certainly does) to a fatal issue, should be well and widely known, lest death should take the friends of the patient by surprise, and arrangements necessary to the welfare of a family be left unmade. Although it is well known that in persons affected with renal disease, or with chronic gout, or with grave disorders of the general health, the commencement of habitual catheterism is attended with peril to life from secondary fever, the fact that this fever may arise in what seems to be good health, and, without the mediation of any visible structural lesion, issue in death, is not well known — or at least well known only to a few — and has, I repeat, no adequate place in English surgical literature or in the English surgical teaching."

29. *Paralytic* affections (if the brain is not involved) require treatment through the spine — dispersive passes, followed by the vitalizing application of the hand — or electric currents in alternating directions through the spinal region affected to the muscles, for about ten minutes. Descending currents are commonly used from a point above the affected portion through the cord to the muscles. But ascending currents are necessary to sustain the vigor of the spine. Faradic currents may be applied directly to the muscles concerned, as well as to the spine and muscles.

When the brain is involved, dispersive downward manipulations may be used over the affected part and very gentle Galvanic currents may be passed downward a week or two after the attack. Such currents are much more beneficial when given through the hand of the operator.

30. *Local* affections require local treatment but may all be greatly aided by constitutional treatment according to Sarcognomy, to increase the vital power and modify the local condition.

31. *Kidney* diseases require local treatment, their spinal control being just above the kidneys. The antagonistic functions which produce their quiescence being located around the shoulder and especially at its superior anterior aspect.

32. *Sexual Vitality.* The sexual force which belongs to the region of virility, and according to pathognomic laws is associated with the upper surface of the brain, has very important relations to health

and normal development which have not been properly realized by physiologists and hygienists. The fact that sexual development makes a great change in the constitution, and is essential to the normal development of every animal, should teach us that it is not a transitory adolescent influence, but an essential part of the permanent organization of life. Hence the maintenance of sexual vitality is essential to the full development of normal life and ethical sentiments.

To overcome the impairment of sexual vitality, reciprocal electric currents may be passed from the first lumbar to the lower sacral vertebræ, and also between the lumbo-sacral junction and the mammæ, also lumbo-sacral and genitals or inside of thigh. The current which embraces the mammæ is the most beneficial and may be assisted by currents between the mammæ and Health, also by primary currents from Melancholy or Disease to the summit of the brain in the region of Love.

33. *Antagonism.* Antagonistic organs oppose each other, each tending in high excitement to suspend or suppress the action of the other, as courage suppresses fear, and benevolence suppresses selfishness. Hence we diminish the excitability and activity of any organ by exciting its antagonist. In a very impressible temperament of but little strength, antagonism by one organ highly excited will suppress its opposite, but in a strong temperament this will not occur ; organs will be restrained by antagonism but not suppressed. Hence in such persons extreme displays of organs such as Insanity or Disease will not be produced. When we wish to make an organ predominate entirely over its opposite, we stimulate it with the hand and make dispersive manipulations over the opposite ; or stimulate by the negative pole and apply the positive to the opposite.

The antagonism to excitability of the heart is on the upper aspect of the shoulder adjacent to the neck. The antagonism to excitability of the lungs occupies the arms from the shoulder to the elbow. This antagonism to their excitability is favorable to their strength. The more sedative antagonism to excitability of brain and lungs occupies the foot and the tibial surface of the leg. The antagonism to gastric and hepatic excitability is on the shoulder midway between the neck and the acromion prominence, extending backward on the upper part of the scapula. The excitability of the alimentary canal is antagonized from the top of the shoulder back and downwards to near the axilla. Uterine and sexual excitability are antagonized on the side of the head (marked Ch.) and below the axilla. Locomotive or restless excitability is antagonized on the side of the chest at the anterior line of the arm, and on the temporal arch at the organ of Tranquillity.

34. *Ethical improvement.* To counteract and correct all moral defects or vices and elevate the character, our manipulations and electric currents should ascend. We should direct our action toward the summit of the chest and of the head and upon these we should place the hands lightly. Thus we may totally change the character in impressible youth, eradicating their evil inclinations by persevering treatment. Husband and wife in many cases could overcome their inharmony and renew their love by this method. With the hands upon the organ of Love or upon the mammæ, sentiments of affection would revive.

To overcome ill temper and moroseness the currents should be directed to the axilla, the mammæ and the upper surface of the chest up to the base of the neck. The primary chemical current may be effective, but the static is superior for this purpose, and the combination of the two gives great efficiency, the chemical current having greater penetrative power. The most desirable of all currents is the combination of static and magnetic produced by my recent invention.

To overcome indolence and moral worthlessness, the currents should be directed to the entire upper surface of the shoulder and the upper margin of the back, from shoulder to shoulder — on the head to the organs of Firmness, Fortitude, Heroism, Integrity, Energy, Cheerfulness and Health.

To overcome a gloomy tendency, direct the excitement to Fortitude, Cheerfulness, Health and Playfulness, on the head and body.

SUPPLEMENTARY SUGGESTIONS.

In the treatment of constitutional disorders, especially those affecting the nervous system, much attention should be given to the hypochondriac region, and to the middle dorsal region of the spine, between its thoracic and abdominal portions, about the junction of the fourth, fifth and sixth dorsal vertebræ, a region of the spine often found sensitive and irritable, sympathizing as it does with the space that embraces the heart and solar plexus, and thus representing a large amount of sensibility. Dispersive passes or dry cupping at this point will often have an important effect, especially on neuralgias.

The fourth and fifth dorsal nerves supply each a branch to the mammæ and a posterior branch which, crossing the latissimus dorsi, is distributed to the skin over the scapula. Thus the regions of Health and Love, which are correlative, are dependent on the same spinal nerves. Reciprocating currents through Health and Love are of unsurpassed value in the promotion of Health.

Dry cupping on the spine at the origin of the nerves of a morbid part is generally beneficial, For the arms this would be at the lower cervical and upper dorsal vertebræ. From the latter proceed not the muscular but the vaso-motor nerves of the arms.

In the treatment of the head it will be important to notice the locations of spots of tenderness or other peculiar sensations which may indicate a morbid condition in the brain beneath. The veins of the brain and the scalp have a communication by anastomosis in the diploë between the outer and inner tables of the skull. I believe the conditions of the brain are also often indicated by the appearance of the surface of the face and neck. Flushed or pale conditions and appearance of slight tumors generally correspond with some condition of the subjacent brain.

Ganglionic Nerves. In the manual and electric treatment of the spinal column I believe that the effects are largely produced through the adjacent sympathetic ganglia, which control the entire circulation of the viscera, and thus accelerate, retard or modify their action. All morbid states of the viscera must therefore be accompanied by corresponding morbidity in the ganglionic nerves. That they do change in visceral diseases, losing their pearly appearance and assuming the inflammatory condition like that of the diseased organs, was shown by the dissections of the anatomist, Joseph Swan, who found these ganglia natural in one who was suddenly put to death without disease, but much inflamed in cases of disease. In a case of tetanus nearly all the ganglia were inflamed, and in a rabbit destroyed by nux vomica all the ganglia of the sympathetic nerves displayed considerable redness.

As the ganglionic nerves are more nearly vertical in their course than the spinal they produce their effect generally lower, and the influences upon the viscera may be traced up to higher portions of the ganglionic system.

Anatomical Suggestions. As anatomical works do not always present clearly the local relations of organs to each other, I would offer a few suggestions to assist the reader, in reference to the thorax.

The sternum is the most convenient landmark for reference. The lower extremity of the sternum reaches nearly to the lower border of the right lung and lower edge of the heart. From the level of the extremity of the sternum a depression runs across the sixth and seventh ribs, which corresponds nearly to the lower border of the lungs. The cartilage of the left fourth rib corresponds to the upper portion of the uncovered heart above which the lung comes to the wall of the chest.

Above the lower end of the sternum the heart extends on the left; below, the liver extends on the right. The stomach is found two or three inches below the sternum, and its entrance or cardiac orifice extends to the left. The cartilages of the sixth, seventh and eighth ribs in front correspond with the level of the liver and stomach.

The right and left lungs unite under the upper part of the sternum, which is usually more prominent than the ribs, but may be flattened if the lungs at this spot are not much developed.

The right ventricle corresponds immediately with the lower half of the sternum and cartilages of the fourth, fifth and sixth ribs of the left side. The right auricle extends a trifle to the right of the sternum. The left ventricle is lower than the right, corresponding to the fourth and fifth ribs. It is covered by the lung more than the right ventricle, which is mainly uncovered.

The aorta rises opposite the junction of the cartilage of the fourth rib and sternum on the level of the sixth vertebra, lying behind the sternum and a portion of the lung. It leans slightly to the left, and arches to turn down at the level of the second costal cartilage and fourth dorsal vertebra. The pulmonary artery passes under the aorta, conveying the blood to the right and ieft lungs. The vena cava lies to the right of the aorta.

The trachea lies in front of the right half of the spinal column and the aorta of the left half. The trachea bifurcates on the level of the fifth dorsal vertebra, and the large vessels rise from the aorta about an inch higher. The left ventricle extends to the diaphragm. As the ribs in front fall below their spinal attachments, we shall find that the heart, corresponding in front with the fourth, fifth and sixth ribs, corresponds posteriorly with the space from the sixth to the tenth vertebra. The whole space from the fourth to the tenth vertebra is opposite the heart and aorta. Examining on these localities we recognize the hypertrophied heart by its thumping violence of action, while the feeble, dilated heart is recognized by a weak impulse but a greatly increased amount of sound, which may sometimes be heard all over the chest. We find an equally important indication in the jugular vein, — a gentle murmur which we can interrupt by compressing the vein with the finger. When we hear this sound we know that the blood is impaired, that it has lost an important portion of the red corpuscles which are essential to health, and needs to be restored to a better condition to produce substantial health. Impaired blood opens the door to all diseases.

For disease of the valves of the heart we examine between the third and fourth ribs for the condition of the semilunar valves, at the entrance to the aorta. Morbid growth there may produce a blowing

sound at the systole of the ventricles, and interfere with the sharp click of the valves, which follows the systole.

The tricuspid and bicuspid valves between the auricles and ventricles give their morbid sounds at the base of the fourth rib just left of the sternum. When through disease they do not close firmly, there will be a regurgitant murmur at the systole of the ventricles from the blood being forced back into the auricles. These valves are near together, the tricuspid of the right ventricle being a quarter of an inch lower than the bicuspid or mitral valve of the left ventricle, and under the sternum.

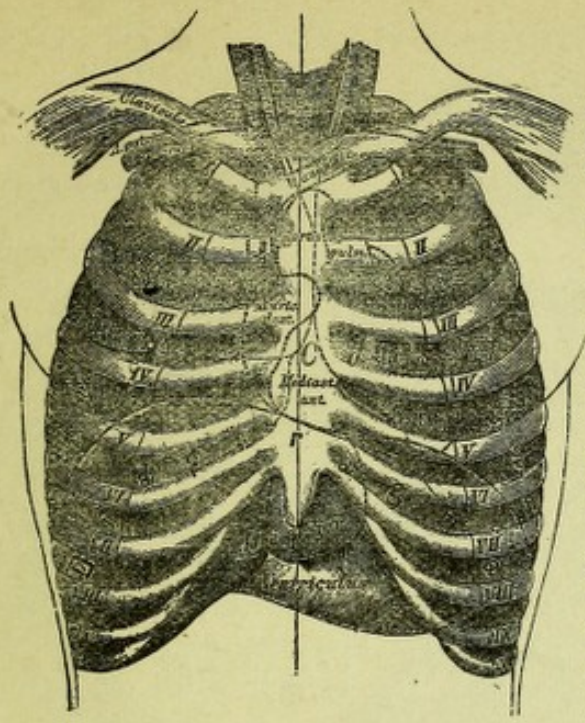
The various forms produced by disease of the valves produce many varieties of sound, which are minutely described by pathologists. Obstruction or disease of the valves tends to produce hypertrophy of the ventricles to overcome it, and thus increase the sound. This may just balance the valvular difficulty. Sounds which are scarcely perceptible when the patient is quiet become conspicuous from exertion or excitement.

Obstructions in the aorta produce hypertrophy of the left ventricle, as obstructions in the lungs produce dilatation or hypertrophy of the right ventricle. Hypertrophy of the left ventricle is injurious to the brain by the violence of its action. Dilatation of the right ventricle is a condition producing great debility, and dropsical tendencies.

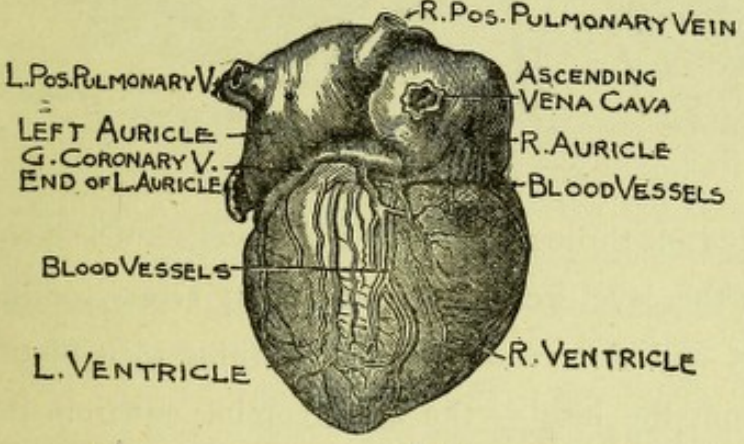
The most important suggestion, however, from this anatomical description is the indication of impaired vitality from impoverished blood — an indication unknown until the time of Andral and too much neglected since — an indication which would have warned against bleeding and other debilitating treatment. I have mentioned the steady murmur of the internal jugular vein which we may hear near the trachea. There is another significant sound — *bruit de souffle* or bellows sound — heard along the space between the junctions of the second and third ribs with the sternum. This bellows sound coincides with the systole of the heart and is heard nowhere else. It is the infallible sign of impaired blood and demands restorative nourishing management, for while this condition exists there is a continual tendency to nervous disorders and impaired health which may end in consumption. Phosphate of iron, fluid extracts of white and red clover blossoms, buckeye, triosteum, saw palmetto, phosphates, hypophosphites and various tonics may be beneficially used.

For the diseased conditions of the heart, convallaria (lily of the valley), cereus and evening primrose are the most valuable remedies. Digitalis is becoming obsolete.

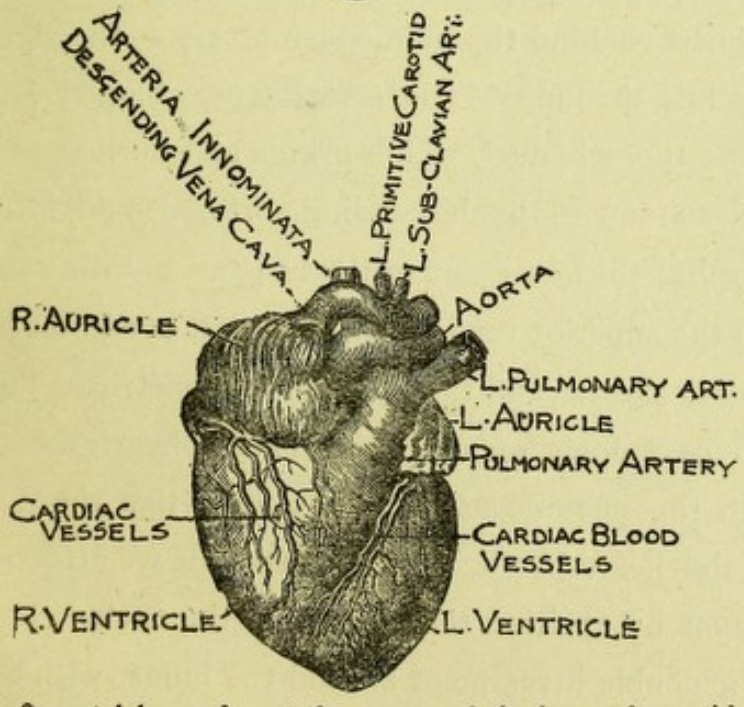
THORAX AND HEART.



The engraving shows the positions perhaps a trifle too high. It shows the position of the heart (*cor.*) — the right auricle (*auric. dext.*) — above which is the *Aorta* — to the right is the left auricle (*aur. sin.*) — between them the pulmonary artery (*A. pulm.*). The large innominate veins are located above, *V. anon. sin.* and *V. anon. dext.*, covered by the clavicle (*clavicula*), which also covers the subclavian artery (*A. subclav.*) and subclavian vein (*V. subclav.*). Above is seen the common carotid artery (*A. carot. comm.*) and jugular vein (*V. jugul.*). The *Trachea* is seen in the middle. The right lung (*Pulm. dext.*) is seen on one side, and the left (*Pulm. sin.*) on the other. The outline of the *Diaphragm* is shown, and the position of the liver (*Hepar*) and stomach (*Ventriculus*). The superior vena cava (*V. cava super.*) is shown, entering the right auricle. Reference is also made to the anterior mediastinum (*mediast. ant.*), in which the folds of the pleura meet on the median line.

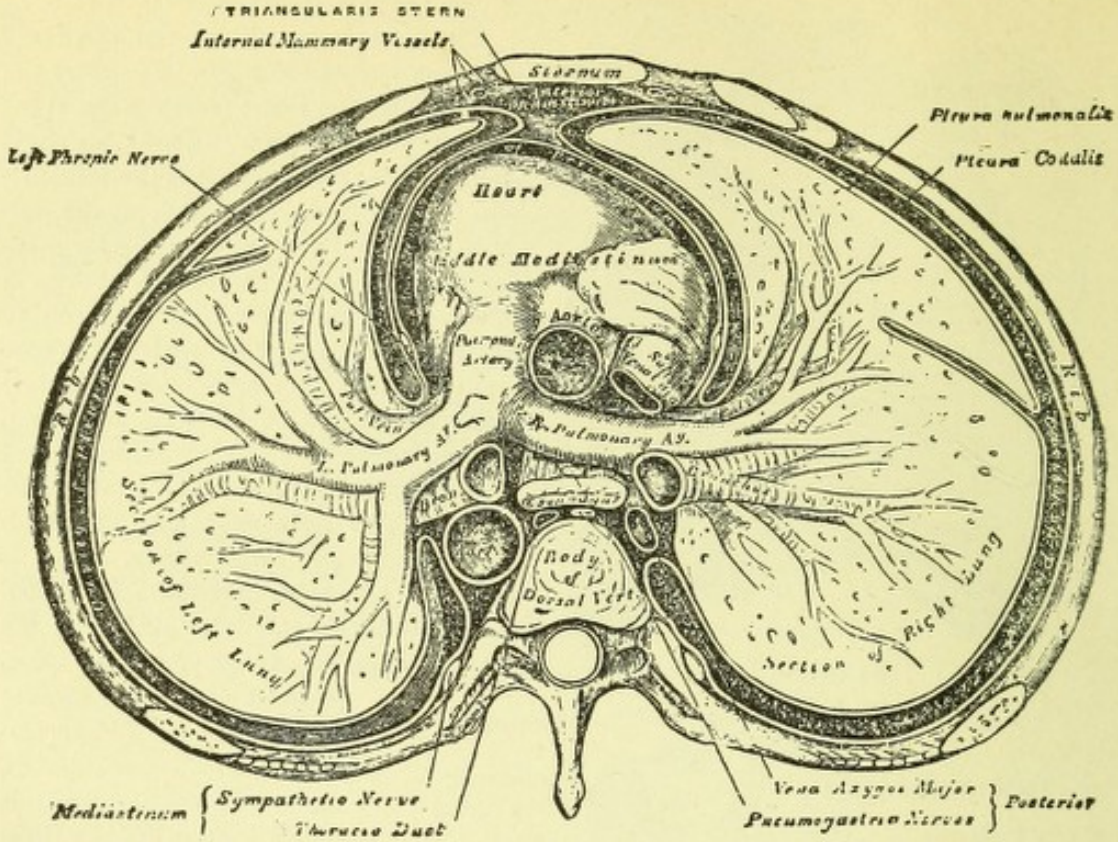


The second figure gives a posterior view of the heart in a vertical position, the left ventricle being most conspicuous. We see the ascending vena cava connecting with the right auricle, while the left auricle receives the right and left posterior pulmonary veins. The great coronary vein and other bloodvessels of the heart are shown.



The third figure is an anterior view of the heart raised to a vertical position, in which the right ventricle and auricle appear most conspicuous. It receives the descending vena cava and sends out pulmonary arteries, as the left ventricle sends out the aorta, subclavian and carotid arteries, and arteria innominata, which should be called the *brachio-cephalic*, as it divides and supplies the arm and head on the right side. On the right side more circulation, comparatively, goes to the muscles, and on the left side to the brain — the left brain being generally stronger than the right.

(Opp. p. 434.)



The HORIZONTAL SECTION through the fifth dorsal vertebra is introduced to show that on this level we find the pulmonary artery coming out of the right heart and the venous blood returning to it by the superior vena cava from the head — the aorta coming out from the left ventricle of the heart, behind the pulmonary artery — the right and left bronchi passing into the lungs — the œsophagus, which carries down the food, and the thoracic duct, which brings up nourishment, adjacent to the spinal column — the descending aorta, also adjacent to the spine, which supplies the lower part of the body — and the vena azygos, which goes to the superior vena cava. The left sympathetic and left phrenic nerve are shown, and the right pneumogastric. The phrenic nerves, which pass down on each side of the heart, are so closely associated with the pneumogastric in the neck, that there is danger of disturbing the heart by the pneumogastric, if we attempt to act on the diaphragm by exciting the phrenic in the neck. The pleura, which makes a double investment around the lungs, with an intervening cavity — the pericardium around the heart — and the middle position of the mediastinum membrane are shown.

(Opp. p. 435.)

RELATION OF THE LIMBS TO THE TRUNK.

This subject has been neglected in the previous chapters. But it is an important philosophic discovery which it is necessary the reader should understand.

The natural position of the arms gives us a hint of the relations of the limbs to the trunk, but such hints might not for a hundred thousand years lead to the discovery, unless the inquirer were exploring in the spirit of philosophic discovery, which has ever been very rare. It was developed to me by the study of the functions which Sarcognomic experiments reveal. I observed in my personal experience the sympathy between the forearm and the digestive organs, especially in reference to assimilative absorption, which the warmth of the forearm promotes. I observed also the tendency of chilling the forearms by cold water to promote the access of a chill. Others had observed that a current of cold water on the wrists had a remarkably cooling effect on the whole system, but this method has not been used by physicians to subdue fever. The initial treatment of fever by bathing the lower extremities has been a very successful method, though not appreciated by the medical profession.

My attention being thus called to the relation of the trunk and limbs — their correlative relation was easily made out. Starting with the already familiar proposition that the upper and lower limbs were absolutely parallel and analogous in function, though in a higher and lower sphere, the ascertained parallelism of the arm with the trunk in a *correlative* way involved a similar parallelism of the lower limbs which it was necessary to demonstrate.

The arm to the elbow, according to Sarcognomy, corresponds to the brain from Dignity and Ambition, inclusive, to the lower level of Arrogance, including the extension of the same within the median line. This occipital tract is correlative with the Modest, Ideal and Reverential range in the temples, from the temporal arch to the cheekbone, which is a pulmonic or thoracic region. The arm below the elbow corresponds with an occipital region, running in on the median line, which is correlative with the digestive tract at the basis of the temporo-sphenoidal lobe (marked on the jaws). The practical demonstration of this pathognomy is that warmth of the forearm promotes digestion and assimilation, which I believe are hindered by chilling it, and that temperature responds to impressions on the wrists, showing that they sympathize with Calorification on the lower bowels. The hands also have a close sympathy with the lower pelvic region.

The therapeutic inference from this is that stimulant applications on the humerus (upper arm) will greatly invigorate or stimulate the

lungs, tending to relieve a cold or congestion, which may also be accomplished pneumatically or by electricity, and that a severe chill at the humerus will be dangerous to the lungs, — a warning against the exposure of the arms. Pneumatic treatment of the arms should therefore be considered valuable in diseases of the viscera. Medicated plasters for the arms will prove efficient. [At a meeting of the New York Clinical Society, May 25, 1883, Dr. E. G. Janeway related a case of cancer of the stomach, in which "the predominant symptoms were neuralgic pains of the arms and legs."]

In reference to the lower limbs, which are parallel in function to the upper, nothing can be more decisive than the act of running or walking up several flights of stairs. This exercise of the thighs compels the most violent respiration. Influences below the knee are responded to in the pelvic and abdominal regions. Foot baths have an important influence on the menstrual flux and a foot chill is dangerous, as many women have realized. The bowels in a sensitive condition are promptly affected by rising from the bed to stand on the feet, and absolute rest of the lower limbs is necessary in abdominal affections. The relief of a case of peritonitis (a patient of Mr. C.) by cupping on the leg and transferring the inflammation from the abdomen, was a good demonstration of this relation or sympathy.

The abdomen, and especially its lower portion, being the organic seat of fever, treatment on the leg should be a most valuable febrifuge, and I predict that the pneumatic boot will prove one of our most decisive agents. Experience with foot and leg baths in fever proves their great value.

If the limbs are thus parallel with the trunk, we are compelled to ask what is the parallel of that restless, irritative region which we find at the knee and at the elbow? We find this on the side of the body adjacent to the elbow, which thus completes the demonstration. This is the region of Irritability, on which the application of stimulant electricity proves very disagreeable, so much as to have attracted the attention of Dr. Beard to the fact. This region corresponds with the liver and the diaphragm. The association of the liver with the irritative passions is well known. To provoke one's anger is sometimes expressed as stirring up his bile. The exciting influence of this region over the whole system is illustrated by the action of the diaphragm, which produces deep respiration, increasing the animal force. It is kept in a tense condition in great muscular efforts.

The intense and passionate restlessness at the knee is the outward expression of the correlative excitement at the waist, and in the basis of the brain just over the ear, which is responded to by the

turbulent region of the middle of the neck which corresponds to the knee. The coincidence of these two regions in the brain proves a similar coincidence in the body.

The great vital force and development produced by the upper end of the thigh corresponds with the energetic vitality of the shoulder, where Firmness and Health make a strong constitution, and the lively Playfulness at the lower part of the shoulder blade corresponds with the active vivacity of broad hips.

The lower end of the limbs (feet and ankles), in their total unintellectuality and initial animalism, corresponds with the base of the pelvis which tends to dementia, and a little higher we find irrational animal impulses which correspond with the Insanity of the pelvic region.

The relations just stated show how important to the lungs is the protection of the lower limbs. Cold applied to the legs and feet tends to produce a hyperæmic and inflammatory condition of the chest, and applied to the thigh it aggravates this condition by paralyzing the vital force of the chest.

I do not rely upon anatomy for the demonstration of functions and sympathies, but it may help to illustrate the relations of the limbs and trunk to refer to the fact said to have been demonstrated by Claude Bernard that the vaso-motor nerves of the upper limbs arise from the dorsal spinal nerves, from the third to the seventh pair, which would indicate a sympathy of the arms with the thorax and upper abdomen, while the vaso-motor nerves of the lower limbs come from the lumbar and lower dorsal region, which would give the lower limbs more sympathy with the abdomen generally and with its respiratory and calorific relations. Certainly they are more effective in developing diaphragmatic respiration and Calorification than the upper limbs.

The practical inference to which this leads is that in treating the thoracic region we may associate with it that of the upper arm and thigh, but in treating the abdominal region we should associate the leg and forearm.

That the analogy of the upper and lower limbs may produce a sympathy between them is illustrated by a remark of Dr. Moritz Meyer, in his work on electricity, who says: "I use with advantage this method of irritation in apoplectic paralysis and contractions; for instance, when both arm and leg are paralyzed, the former, however, more than the latter, I expect simply by electrizing the muscles of the arm that the paralyzed muscles of the leg will be reached." (P. 155.)

An important practical consequence of this doctrine of the limbs is that our hygienic authors are seriously mistaken in their views of

pulmonic development. I do not refer to the common error of dwelling entirely upon diaphragmatic or deep breathing to the neglect of costal or upward breathing, but the common error of giving nearly all the attention to exercises of the arms for chest development. The thighs greatly excel the arms in muscular development, and in their relation to vital force. Hence exercise of the thighs is far more efficient than any exercise of the arms in compelling chest expansion. In ascending a long flight of stairs we are compelled to use all our respiratory power, and in running we soon find that we cannot expand the lungs sufficiently to sustain our exertion. Hence, as a means of thoracic development, walking, running, leaping and mountain climbing take the precedence of all other exercises.

The great vital muscular force of the thigh renders injuries of that region extremely prostrating and dangerous. Of the soldiers shot through the knee in our late civil war few if any recovered except through amputation.

After a recent fall upon the knees, I found the vital force of the entire constitution greatly reduced.

CHAPTER XXI.

ELECTRO-THERAPEUTICS.

GENERAL STATEMENT.

Nine methods of electrical treatment: galvanism, primary, secondary, combined, static, unilateral, statico-chemical, magnetic and electro-medical — Use of the commutator — Simple stimulation — Rheostat — Use of the alternating current and its locations — Anterior and posterior, superior and inferior — Method of using the negative pole — Method of manual and of electro-medical treatment — Nature and use of the positive and negative in electricity — Static electricity and magnetism.

In the treatment of the human constitution by electricity there are the following nine methods: —

Chemical electricity generated by acids and metals.

1. GALVANISM produced by chemical action with two plates; one easily corroded, which originates the current, and the other, more difficult to oxidate, which receives the current from the first and gives it off by a wire or other conductor which carries it back (exteriorly to the cell or the battery which contains the acid) to the first plate. The first is most commonly zinc; the second, copper or carbon. The wire from the carbon conveys the current of positive electricity; the wire from the zinc produces a negative condition or current. The half of the wire next the carbon is in a positive condition, the half next the zinc is negative, and midway between the two the condition is neutral. The galvanic current from a single cell being very feeble, from five to fifty cells are used for a medical current.

Chemical electricity modified by a current.

2. The PRIMARY or interrupted galvano-magnetic current produced by reinforcing the galvanic current with the magnetism of a rod of iron, magnetized by the current conducted in a spiral coil around the rod (which is called a helix) and rapidly interrupted by breaking the connection so as to produce a succession of fine shocks with great rapidity. The interruption, which renders the current very forcible, is produced by the magnetized iron attracting a spring out of its position so as to break the connection and interrupt the current. A good helix increases the power of the current, so that a single cell will give all the electric force a patient would endure.

The primary or galvano-magnetic current is like the galvanic or one-

way current, which, applied to the human body, propels the fluids and nervous forces in the direction in which it moves and produces some chemical action.

3. The SECONDARY or Faradic current (named after Faraday) which is produced by the primary (interrupted galvano-magnetic) acting upon a coil of wire exterior to the primary coil and not connected with it. An electric current in one wire produces an opposite current in a neighboring wire, and hence a current in the interior coil from left to right would produce a current in the exterior coil from right to left, and the moment this primary current is interrupted, the secondary current reverses itself, flowing back in the same direction as that of the primary. This reversed action (coinciding with the primary) is considered the stronger action of the two, and hence is called positive; but, as the secondary is a two-way current, the distinction of its poles is not so great as in the primary. The positive and negative of the primary will decompose water into oxygen and hydrogen, but the double action of the secondary prevents this chemical action. The secondary current may be used as stimulus at both poles, but the primary stimulates at the negative and has a sedative influence at the positive. The stimulus is due to the attraction or propulsion of blood and nervous influence toward the negative electrode. The sedative influence of the primary is due to its dispersive effects and tonic character, by which it relieves inflammation and congestion.

4. The COMBINED primary and secondary currents are stronger than either separately, and have a clear distinction of positive and negative poles.

5. The current of STATIC or frictional electricity, usually produced from glass by motion or friction without chemical action, has a powerfully diffusive tendency, from its expansive self-repulsion, and hence forces its way with great facility, and tends to play upon the surface of bodies and to escape where it can find a conductor. Hence it acts chiefly upon the surface of the human body, stimulates the skin, and by this universal action stimulates the entire brain and nervous system. Passing with greater facility, it does not, like the chemical electricity, require contact of the electrodes with the body, and the use of fluids on the skin, to facilitate conduction, but may be applied freely through the clothing, if in sufficient force, and by conductors or electrodes, several inches from the surface of the body, negative electrodes drawing a current from the body, and positive electrodes giving it a current.

The static electricity may also be administered by accumulating enough to give a shock, either from a Leyden jar or a well-charged electrode. Treatment by gentle shocks is not so pleasant or effective

as by currents, but in the practice of Dr. Gale of New York at the close of the last century it was used with signal success, because he applied it skilfully to a great variety of diseases.

The diffusiveness of static electricity is so great that the patient is commonly insulated upon a platform with glass legs; but insulation is not absolutely necessary if we have a good machine. A piece of rubber cloth to insulate the feet and chair of the patient is usually sufficient.

6. *The unilateral method* has been neglected by therapeutists. This method places the patient entirely under the influence of positive or of negative electricity. With the static machine he is insulated and fully charged with a positive or negative condition, so that sparks will pass between the patient and one who touches him — a method which has been advocated by Dr. Radclyffe of England. A full charge of positive electricity is a valuable and genial stimulus.

I have however seen no mention or recommendation of the unilateral method in the application of chemical electricity by the galvanic and the primary current.* In the administration of such currents, as usually given, the positive influence predominates in that half of the current which is next the positive electrode, and the negative on the side of the negative electrode. Thus, in passing through the hands, they would meet at the spinal column, where the influence would be equipoised or neutral. The neutral point depends on the facility of conduction, and may easily be arranged so as to leave the entire course of the current in the body either positive or negative. If, for example, we apply the negative electrode to a part of the surface where the skin is absolutely dry, while the positive side has a good conductor and a moist surface, the negative electricity will be nearly excluded and the positive will occupy the entire route between the electrodes. Thus the patient may be placed under positive or negative influence by obstructing the access of one of the currents. If sponges are used as electrodes it will be sufficient to have one of them well charged with salt water and the other barely moist. With metal electrodes one may be covered with cloth or leather almost dry, or may be connected with the body only by strips of wet cloth several inches long. It

* Since the above was in type I have seen a book by a Western physician containing many good suggestions, and recommending strongly the use of the unilateral currents, but not proposing a proper method. His suggestion of using a longer conducting cord for the current to be partially excluded would be quite ineffective, as the difference of conductivity between three feet and six feet of copper wire could not be appreciated. A copper wire (1-20 of an inch) one hundred miles long would offer less resistance than that offered by the human body to a current from the right hand to the left. An iron wire of the same diameter would offer about five times the resistance of the copper, hence a small iron wire might be used efficiently. The resistance is easily established where the electrode touches the body by interposing a sponge or wet cloth. It may also be made with scientific accuracy by a rheostat of water or German silver.

should be remembered, when we wish to send in any influence with the positive current, whether that of medicine or of the human aura, it must have free access, and the negative current should be obstructed.

7. *The statico-chemical combination.* The static current is unequalled in pleasant and beneficial effects, but has not the penetrative power and chemical energy of galvanic and primary currents. Hence I recommend what authors have neglected as unknown, the combination of the static with the primary and galvanic currents — their wires being brought together to the same electrode. The combination of the static and primary may be recommended when we wish to make a strong as well as restorative impression, less harsh and more beneficial than the combination of primary and secondary. This combination may also be used in the unilateral manner, and the combination of the two positive electricities, thus applied, is a powerful tonic.

8. *The magnetic current* is the complement of the static, and the combination of the two as statico-magnetic is the most perfect and hygienic current ever discovered. Its discovery and demonstration in 1888–89, should, I think, make a new era in electro-therapeutics. My prior discovery of the modifying power of medicines upon electric currents necessarily led to the inference that a current through a magnet would carry a magnetic influence. The well-established value of the magnet as a local application for disease and the fact that very few could feel any decided influence from the contact of the magnet, and consequently that its agency was rejected by the medical profession, made it very necessary that its magnetic energy should be conveyed by the electric current.

The magnet is the opposite and therefore the complement of electricity. Electricity is repulsive, magnetism is attractive; electricity is heating, magnetism is cooling; electricity disorganizes and decomposes, magnetism is constructive, reparative, organizing. Static electricity goes to the surface and seeks to escape, magnetism reaches the interior and makes a less evanescent impression. Thus, while static electricity animates the nervous energies, magnetism sustains their organic basis, and promotes all reparative processes.

Magnetism, therefore, has a wide application in fever, inflammation and all exhausted conditions, and becomes the proper companion of electricity in all its four forms — static, galvanic, primary and secondary.

Magnetism has two conditions — analogous to the positive and negative. The magnetism of the north pole resembles slightly the influence of positive galvanism and imparts an infinitesimal taste of

acidity to water, while the magnetism of the south pole is less tonic and imparts the alkaline taste. Hence, in treatment, we use the north pole as a tonic or positive, and expect a more gentle influence from the south — a distinction readily recognized by the sensitive. We shall have ample illustration of the therapeutic effects of magnetism in a great variety of diseases, and of the difference of the two poles, when electro-therapeutists shall have adopted this improvement; and I would be grateful to those who first engage in this practice if they would send me the record of their experience in the combination of magnetism with static, primary, secondary and galvanic currents and medical potencies.

9. *The electro-medical current.* For many years (over 45) I have been familiar with the fact that medical potencies proceed diffusively from medicines, without their being received into the body, and without their being even in contact with the surface. I have also for many years known that an electric current through the medicine would carry its influence into the constitution and even into that of another person through whom the current was made to pass. Thus, in a group of ten or a dozen persons who joined hands, the medicine through which a positive current was passed at one end of the group would be recognized by the whole group though which the current passed, with different degrees of distinctness according to their impressibility. Some would be incapable of feeling such currents as I used, but it was very seldom that any of my students would fail to recognize and feel them distinctly, so as to be able to state their character. Insensibility does not prove the absence of influence, as most persons are unconscious of the operation of medicines of which they have swallowed a moderate dose.

The medical profession has believed that medical effects could be produced only when the substance of the medicine was carried into the body by the current, and the possibility of this was long denied. The possibility of carrying in the potency of a medicine without any of its substance by a current which traverses metallic conductors before entering the body would be universally and perhaps scornfully denied in medical colleges,* though I have for some years been demonstrating its practicability in my courses of lectures, and sensitive individuals have often detected the character and given the name of the medicine affecting the current, when it was one with the effect of which they were familiar.

The reader will recognize the great advantage of thus saving the stomach from medical annoyance, applying the remedy just where it

* A patent-office examiner refused to entertain an application for a patent embodying this principle, because he considered it a self-evident impossibility.

is needed and discontinuing the impression promptly when desired.

In treatment by electricity we need to acquire a clear idea of the effects of positive and negative conditions, on the human body, and the effects of the electric currents.

Heretofore positive and negative conditions have been studied as local influences, with little thought of the *separate* pervading influence of each throughout the body.

Nor has there been any thorough knowledge of the effects of electric currents on the body and mind, for which we are indebted to Sarcognomy. Every current goes from one locality to another; hence, as a general rule, it diminishes the activity and influence of the part at which it enters (the anode) and increases the influence and activity of the part to which it goes, (the cathode) unless the cathode be too far from the neutral point between the poles.

If it traverses in both directions alternately, it becomes a stimulus at each extremity, as when the current is reversed by commutation. We approximate this condition of reciprocal stimulus in using the Faradic or secondary current. In the common battery there is no arrangement to produce a reciprocal current, and hence the commutator would require an additional operator, while the electrician is applying the electrodes. To overcome this difficulty I have invented a commutating electrode, by means of which the operator in handling the electrodes can reverse the current as often as he wishes. This reversal not only renders the current a stimulus at each end, but increases its effect beyond that of mere interruption, by the extreme variation between plus and minus conditions, — the effect of electricity being proportional to the amount and frequency of the changes. A smooth-flowing current is unnoticed, an interrupted one is vividly felt, and a commuted one makes a still stronger impression.

Simple Stimulation. — The simplest form of treatment is by equilateral stimulation with commuted or with secondary currents. The secondary currents may also be commuted so as to make them perfectly equilateral. In this method of treatment, we apply the electrodes on the corresponding spots on two sides of the body, to stimulate the right and left organs of any function, or we may apply on one organ on one side, and on another on the opposite side, if we wish to stimulate two at once (such as Health and Vital Force), changing each electrode soon to the opposite side, to equalize the effects. With bifurcated electrodes we may treat both sides equally at once.

The result, simple stimulation, *may be* thus attained when we have free access to the person, by shifting (alternating) the elec-

trodes, but it is not convenient to do this with the frequency required in such alternation; and as in the great majority of cases it is not desirable to give the negative influence as much scope in the body as the positive, the preferable method is to use the commutating electrode, and to limit the accessibility of the negative influence, which may be done by using a copper wire for the positive current and a smaller iron or steel wire for the negative, in connection with the helix. By this method we insure the predominance of the positive current in the body, and without excluding the negative we reduce its influence on the patient as low as we may desire by the length and fineness of the iron wire.

In those cases in which, from the torpor, inactivity and lack of circulation in any organ, the negative influence is more desirable to secure the afflux of increased circulation by relaxing the blood-vessels, we may use two equal copper wires for the positive and negative, but in all other cases an iron wire of small dimensions for the negative will be preferable, and will be a more exact method than relying upon sponges or any other indefinite mode of obstruction. Another method, better and more exact, and almost equally simple, is to use a water rheostat for negative obstruction, by inserting sharp pointed wires through the corks of a small glass tube, containing water or even fluids of less conductivity. As the wires are inserted farther or withdrawn in this simple rheostat, the conductivity is increased or diminished, so as to give us a definite idea of its amount.

The rheostat is especially necessary in using my medical electrode, to overbalance its resistance to the current and insure the entrance and diffusion of the positive medicated current, without yielding much space to the negative influence.

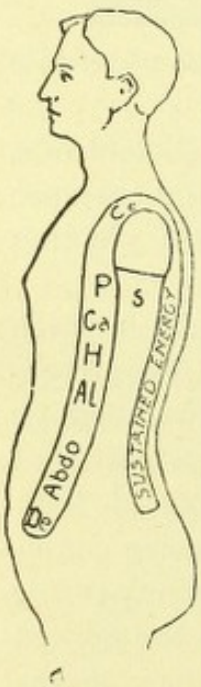
I do not propose to exclude negative influences entirely, for each influence has its merit and these merits may be combined by alternation in such proportions as each case seems to require. The negative condition by relaxing the vaso-motor nerves promotes an afflux of blood, and by attracting the positive promotes the afflux of both blood and nervous influence. At the same time the positive condition, while moderating this influx, imparts a wholesome tonicity to the organs. This combined and equal influence is similar to the normal condition of organs under gentle stimulation. But some organs require more of the negative influence to rouse their stagnant vitality, and others require more of the positive to overcome their relaxed condition, and the vaso-motor debility, so as to relieve congestion, which must be ascertained by careful diagnosis.

Hence the primary current may fill a large space in our practice by giving equilateral currents on the right and left sides, or by stimulating two different organs at once on the same side, or by treating two opposite antagonistic organs with the positive and the negative condition so as to secure the predominance of either. When this is done, the negative electrode in the great majority of cases will be applied on the posterior and superior surfaces, and the positive on the anterior inferior, as when we make a current from Disease to Health, or from Melancholy to Cheerfulness, taking care in all cases that the access of the negative is obstructed.

The alternating or commuted current may be thus beneficially applied between the anterior organs and their posterior spinal sources of power. As it is not beneficial to stimulate any anterior function greatly without its posterior support, the alternating current or the secondary current will be required in many cases, as when we stimulate any of the viscera of the trunk by alternating currents between the spine and a proper anterior location for each of the viscera.

Thus for the abdominal functions we may cover the lower half of the dorsal region with a broad electrode (or moist sponge) and place the other on the gastro-enteric or abdominal tract (Abdo.), anywhere from the gastric location marked as Alimentiveness (Al.) to that of Defecation (De.).

Immediately above the gastric location (corresponding to Alimentiveness) is the Hepatic location (H.) corresponding to the liver. These locations the reader will observe are nearer the side than the front. I do not recommend operations on the extreme frontal organs of either body or brain, which would concentrate excitement upon them; for the tendency of the frontal organs is to sensibility, impressibility and exhaustion, while the lateral organs are exciting or stimulating, and produce generally only the moderate exhaustion of fatigue. The excitability of the heart is stimulated just above the hepatic location (Ca.), and as we go back along the ribs excitement is gradually modified into power, with less of excitability. Thus we find just behind the arms, below the middle of the humerus, the region of Force, which gives tonic strength to the heart and the whole constitution.



Above the cardiac region we find along the ribs, just in front of the arm, the pulmonic region of Inspiration (P.), which gives activity to the lungs in costal respiration.

Above Inspiration the influence is cephalic (Ce.), giving activity to the brain, while at the summit of the back it gives power as well as activity. Passing back under the arms, we find mental strength as well as activity in the region of Sanity (S.). Thus from the summit of the chest to near the base of the abdomen, near the lateral surfaces, we have the tract of visceral excitement and activity, along which one of the electrodes should play while the other is on the spinal column or near it, with an obstructed negative influence.

This tract of excitement is a little anterior to the median line on the side of the body. If we should take a similar or parallel column on the back behind the arm, from the shoulders to the hips, half way between the column of active excitement just described and the spinal column or seat of power, we would find it a region of active, sustained energy. Thus we find all the tonic influences on the back; and advancing to the front we find excitement, delicacy and exhaustion. Hence our electric currents should advance with positive force to the back, meeting the negative condition near the posterior surface, unless in cases of torpor in the posterior region we make the neutral meeting point an inch or more anterior to the spine, or even midway between the two electrodes, to secure a negative influence at the spine. Beyond this I would not go in any case, as the complete predominance of the negative would be quite objectionable.

The tonic influences of the back may be developed by alternating currents on the same level of the back, or between higher and lower locations, as the case requires. The reader will of course bear in mind that, in these cross currents on the back, less electric energy is required as the electrodes approach each other, and the more as they are farther apart. The very normal activity on the level of the shoulders gives a harmonious combination of the brain and the muscular system, but as we descend, there is less of the brain and more of the muscular force, tending to exhaust the nervous system if prolonged.

The pathognomic laws of life not only give the superior vital character to that which is posterior over the anterior and that which is superior over the inferior, but give a higher vital character to muscles which act in such directions. Thus it was shown by the careful experiments of Onimus on the muscles after decapitation of animals that the first muscles to lose their contractility are the diaphragm which acts downwards and the tongue which acts forwards. The extensor muscles, which throw the limbs outward and downward, lose their contractility an hour sooner than the flexor muscles, which draw upward and backward. The muscles of the trunk retain contractility five or six hours, and the abdominal muscles, which act

backward and upward, retain their contractility longer than any others, — more than six hours after death. The same principles are illustrated in paralysis, the extensors suffering sooner and more severely than the flexors, and the abdominal muscles being the last to suffer.

The superiority of the central regions over the peripheral, and consequently of ascending over descending currents, is shown by the statement of Althaus that a muscular contraction may be produced by a feebler current when the negative electrode is applied above than when the positive is above. The muscular contractility increases in such experiments, but does not increase under Faradism. For the same reason, less effect is produced by operating on the nerves of the lower limbs than when we include the lumbar region of the cord, and still greater effect occurs when one of the electrodes is carried up to the neck. Prof. Heidenhain has shown that in the muscles of a frog which had lost their excitability by fatigue or ill-usage a continuous current for half a minute or more would restore them, and that the ascending or inverse current was more efficient or complete in effect than the descending or direct.

The motor nerves in death, as shown by Bernard, lose their excitability from the periphery toward the centres, and when the nerves near a muscle have lost their excitability they are still excitable near the cord. When we operate on the muscles directly we require a stronger current than when operating through their nerves.

In applying electrodes on the body for therapeutic treatment, there are important principles which have been overlooked, the neglect of which may cause a failure in the treatment. I have already endeavored to make it clearly intelligible, but it will bear further illustration, even if a repetition.

The negative pole has been recommended in my writings as the stimulating pole for all organs, to produce the beneficial effects which are produced by the hand. But the *negative pole is not a stimulus;* on the contrary, its influence is relaxing, tending to debility and congestion, or hemorrhage, while the positive is the strong current, overcoming congestion and hemorrhage.

The beneficial effect of the negative pole consists largely in attracting the positive current to the spot where it is applied, thus producing a concentration of energy. This is due to the positive current, though it may be assisted by the gentle relaxation produced by the negative condition.

In the ordinary administration of the current under equal conditions, the negative and positive meet midway between the electrodes, one half of the channel in the body being in the positive and the

other half in the negative condition. This is not desirable, for unless the positive current be very strong there will not be enough of the positive influence in the negative half of the circuit to produce the amount of stimulation that is desirable, although the effect may be generally good.

If the positive current be hindered by a rheostat or by dryness of the skin or any other cause, the neutral point will be near or at the positive electrode, and the negative influence will rule in the circuit. This will defeat our purpose of using the negative as a stimulant, and the stimulation will be chiefly at the positive electrode, reversing the result desired. Thus a current from Disease to Health, with the positive electrode partially shut off, would be depressing and debilitating; whereas, if the positive electrode be a good conductor (such as a broad metal surface) and the negative electrode be obstructed, the body will be occupied by the positive current on its way to the negative position on the shoulders, at which it concentrates, producing a strong stimulation of that spot.

Hence, if we propose to use the negative electrode as a stimulant, it must not, as already stated, have too free access to the person, and the positive must have much freer access.

If I put a metallic electrode on the shoulder (the skin moist) for the negative pole and a slightly moist sponge at the hypochondria for the positive pole, which seriously obstructs the current, the entire tract in the body may be occupied by the negative condition, which meets the positive in the sponge or at the margin of the trunk near it, or perhaps in the liver; and the effect, *if continued*, will not be tonic or healthful; whereas, if we place the metallic electrode below, with a positive current, and the sponge on the shoulder, the effect will be tonic and healthful, bringing out the true character of the shoulder, by its reception of the positive current from below.

Hence we deduce the important rule of therapeutic treatment, that the negative electrode when used as a stimulant *must always have its access to the body obstructed* in comparison with the access of the positive. This may be effected by the dryness of the skin or by a certain thickness of the conducting sponge or cloth, or in a more exact method by using a water rheostat in which a certain length of the current shall pass through water, or by some other form of rheostat. These precautions are not so necessary with the secondary current as with the primary and galvanic, for it has not a thoroughly negative condition.

In using static electricity, the same principle is carried out by treating the patient with a negative electrode held near the person or upon the clothing, the body being filled with the positive current.

In treating with static electricity, the body may be filled with either condition from one pole, the other pole being allowed to communicate with the earth; but in using the dynamic or chemical electricity, the saturating of the body with either kind of electricity depends on the partial exclusion of the other, while the current is uninterrupted.

The partial exclusion of one current is effected by giving it a longer or more difficult route. This, I believe, is often done without reflecting on the consequences, as when the operator administers the positive current through himself. (He cannot afford to hold the negative electrode, as it would bring to him the influence of the patient.)

If he treats with the right hand, holding the positive electrode in the left, he gives the positive current the obstruction of fully five feet of his own person, thus placing the patient under the influence of the negative condition entirely, if the negative electrode has free access, and even introducing the negative condition into his own arm. This is a serious and very injurious mistake for the patient. To operate in that way it would be necessary to place the negative current under still greater restriction than the positive, by an obstruction or rheostat, making greater resistance than his arms and body, and to increase the strength of the current to overcome the great resistance. The current strength should always be adjusted to the amount of resistance or the distance traversed.

If the operator wishes to have the beneficial effect of his hand as an electrode, he can effect this by simply tying a good electrode on the wrist of the hand with which he treats the patient, the obstructive influence of which may easily be counterbalanced on the negative side. A bracelet or a rubber band with a piece of metal on its inside will answer for this purpose.

In passing the positive current through a medicinal substance for the benefit of the patient, the same principle must be borne in mind, and an amply sufficient obstruction placed at the negative electrode to insure the positive current freer access.

The possibility of using the dynamic or chemical electricity in the same manner as the static, by accumulating in the patient the influence of either pole, omitting the other, has not, so far as I am aware, been recognized by the profession.* It is clear, however, from what has

* In a German publication of 1872, the unipolar method was presented, and I find the following statement in Lincoln's Electro-Therapeutics. "Clemens of Frankfort has a method called the '*unipolar*,' which he considers possesses a power to quiet spasm and allay pain, and in general to exert a soothing influence upon the system, which is desirable in the initial stages of diseases of the spinal cord. His patient's feet are placed *on a thin bit of wood*, resting on the metal plate already described, the plate being in connection with the negative pole of a powerful Faradic apparatus.

already been stated, that the patient may easily be saturated with the influence of either pole, by partially excluding the other. It is also true that while the patient is under the influence of one pole exclusively, the other may be turned loose, like the pole of a static machine, to communicate with the earth, making what is called an earth circuit, instead of returning direct by wire to opposite pole. In this we have an apparent analogy to the unipolar use of the static, but the dynamic electricity depends for its action upon a definite channel, of which the earth may be a portion, of any extent, but without a completion of the circuit there is no current or electric effect. There must be one wire going out with the current reaching the moist earth, and another returning from the earth, making the marvellous connection through a vast extent of earth. But the static has so great a diffusive power that it sustains the current of two polarities without any apparently satisfactory connection. It is customary to connect one pole with the earth, or with the iron pipes of the house, but the accumulation of the positive will not be prevented if the negative wire has a very imperfect route for the circuit.

THE NATURE OF POSITIVE AND NEGATIVE IN ELECTRICITY

As relates to human life has not yet been explained, but I think I have found the explanation.

As positive electricity causes the contraction of muscles and the contraction of vaso-motor nerves, while it diminishes nervous sensibility, it is clear that its influence corresponds to that of the occipital half of the brain, and rather below than above the middle. The negative condition, which softens and relaxes, increasing nervous sensibility, corresponds in its influence with the anterior half of the brain, and especially the anterior superior region, in the neighborhood of the coronal suture and temporal arch. It is thus felt by sensitives.

Hence it is by the positive current that we invigorate life in all parts of the constitution, without invigorating the more delicate functions of the nervous system, which are promoted by the negative.

The combination of the two makes nearly a complete development of function, and to produce this complete development we should combine them in the proportions required by the condition of each organ, by admitting one with greater or less facility than the other.

As the positive current is the great energizing power, like the occipital brain and the posterior half of the body, it must be our chief

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while the positive is applied to the spine in the neck. He says that the whole body thus becomes charged with electricity of high tension." This statement, which the author tries to discredit, is a very rational one. The negative influence is largely excluded, and the spinal column placed under the influence of a strong positive descending current, which if continued would be a powerful sedative, appropriate, however, only when spinal inflammation was present or threatened.

reliance, and I have endeavored to show that the negative pole may be used upon posterior surfaces so as to attract to them the positive condition.

I have also shown that the negative condition cannot be rejected, as it increases the nervous sensibility and the afflux of blood, softening and opening the tissues, in which the circulation has been deficient.

Of course, the positive condition is the antagonist of inflammation, in which the bloodvessels and tissues are relaxed; and also in fever, in which a similar relaxation exists, and a septic tendency, which the positive or acid condition counteracts, being not only antiseptic but destructive to morbid germs.

The negative or alkaline condition should not predominate in fever, in which the tendency to dissolution and decomposition is already too active, which the alkaline condition promotes. Fever demands the antiseptic energy of the positive condition, but it demands still more the antiseptic, cooling and soothing influence of magnetism, which is so similar to that of the human nervaura. Hence the positive and magnetized current is its proper treatment.

The negative condition is a grateful influence to check the effects of over-exertion and excitement, and hence is most agreeable to many. It tends also to promote secretion, as well as circulation, and thus to remove morbid deposits and promote absorption, revitalizing torpid and obstructed organs. Hence it is very important in *defective development, atrophy, and paralysis.* It is for this reason that, in cases of advanced paralysis, the galvanic current has been found so useful and the Faradic so ineffectual, for the latter has not the solvent and alterative power, and the capacity for reviving circulation and sensibility which belongs to the negative condition. These virtues have been attributed to the galvanic, in opposition to the Faradic current, but they belong to its negative portion, and if the patient were confined to the positive galvanic, it would not be found so widely different from the Faradic in effects. The chemical influence of the Faradic is neutralized by the fact that each pole becomes alternately positive with inconceivable rapidity.

In treating thus with the negative to revive impaired organs, its operation must of course be judiciously limited, as a prolonged action would be injurious; and as the organ recovers, the negative influence should be more and more obstructed. When circulation and nervous influence are restored, the alternate current of the commutator and the Faradic current become appropriate, and in using the Faradic current a frequent reversal is desirable, that the spinal column and the dependent organs may be treated equally.

Although the negative condition is of little use in advanced fever, it

is not so inappropriate in inflammation. Inflammation is *counteracted by secretion* which the negative state promotes, and by alkaline conditions which dissolve or suppress the fibrin of the blood, which is characteristic of inflammation. The negative influence corresponds to the antiphlogistic solvent and sorbefacient influence of the alkalies, an influence which in excess may result in dissolution of the blood, hemorrhages and congestions, but which in judicious, moderate use checks inflammation and promotes the removal of all morbid growths and deposits. Thus alkalies (especially carbonate of ammonia) are very valuable in tuberculous consumption as sorbefacients, although their excessive use would be destructive. When combined with a tonic element, as in the muriate of soda and muriate of ammonia, they are very valuable preventives and curatives for the tuberculous constitution, the value of which has not been properly appreciated, though established by experience. In like manner the negative condition, properly limited and sustained by the positive, is of great value, and this combination is happily illustrated by the two muriates.

The foregoing remarks do not apply to static electricity, for the static positive is not like the dynamic or chemical positive — it is not an occipital influence but an all-round brain power, promoting all the phenomena of active life in a harmonious manner, without the sedative, relaxing influence of the dynamic negative. It is the natural stimulus of animal and vegetative life supplied by the sun — an absolute necessity, the deficiency of which characterizes great epidemics.

But in promoting active life it does not *complete* the functions of life, which include the restoration that is accomplished chiefly in repose. We need another influence for this purpose, and that influence I have found in MAGNETISM. But magnetism is not an aggressive, locomotive energy. It is a static condition, resting in the iron, and having little influence on the human constitution unless its nervous sensibilities are highly developed ; hence rejected by the medical profession, which recognizes only gross powers and substances, though used among those who cultivate animal magnetism, and the makers of magnetic garments, which affect the sensitive.

To make magnetism an important therapeutic agent, it must be carried into the human body by an electric current. And as the possibility of carrying potencies by means of electricity is not yet known in medical schools, it is probable that it will be very positively denied, as there are many who feel that the title of professor or even doctor authorizes them to deny positively the existence of any very remarkable fact in science with which they are not acquainted. It is to be hoped, however, that in the progress of evolution the human brain will be sufficiently developed to suppress *dogmatic* education and dogmatic

institutions, and to realize the incalculable magnitude of the unknown truths which are yet to be learned, and which it would be puerile folly to deny or ignore. The reader will pardon my frequent reference to these obstructions, for they are a mighty barrier to human progress, and discouragement to original thought and investigation.

NATURAL INFLUENCES. — In addition to these artificial agencies, we have a similar influx from Nature. The sun is a continual source of the varied potencies of electricity, light, color and warmth, while the earth is a vast magazine of magnetism destined to play an important part hereafter in therapeutics, of which I may give an exposition hereafter. These magnetic currents may be seized as they travel round the earth by tapping them with copper wires leading to our patient. My time is too thoroughly engrossed with other duties at present for the elaboration of the doctrines of terrestrial magnetism and other applications of electricity which are possible and which I now have in view.

CHAPTER XXII.

REVIEW OF THE CURRENT DOCTRINES OF ELECTRO-THERAPEUTICS.

The galvanic current, the Faradic and their phenomena — their taste — their action on muscles. Negative and positive currents. Merits of galvanism, Faradism, and static electricity. Their reception by the profession. Electricity as a test of death. Heat developed by the current. Sensations from currents. Value of the Humboldt battery. Chemical effects and prolonged influences. Use of the two-plate battery. Action of galvanism on motor nerves and production of increased strength. Effects of direct, inverse and alternating currents. Character of the Faradic or induced current in comparison with the galvanic. Experiment on vibrating cilia. Refreshing and strengthening effects of galvanism. Exhaustive effects of Faradism. Anodyne effects of galvanism, and cases requiring Faradism — how its effects are produced. Cure of locomotor ataxy and neuralgia by galvanism — its catalytic effects. Cutaneous Faradization. Cure of contractions. Treatment of antagonistic muscles. Harsh effects of Faradism. Remarkable physiological errors of Prof. Claude Bernard. Antagonism of the sensitive and muscular systems. Relation of the nervous system to growth. Danger of Faradization on the front of the neck Cures by galvanism when Faradism had failed. Effect of the interruptions. Comparison continued. Direct action on the muscles. Penetrative power of currents. Stimulant action of Faradism. Medication by electric currents. Removal of poisons by electricity. Injurious effects of the common batteries. Advantage of the muriate of ammonia. Action of galvanism on the ganglionic nerves. Its antispasmodic influence. Distinction of voluntary and involuntary strucures. Galvanic current down the bowels for constipation. Failure of Faradism. Differences of electrodes. Interruptions. Delicate currents. Practical value of the primary current, intermediate between the galvanic and Faradic.

In the use of electricity the galvanic or continuous current develops two different conditions, the positive pole introducing an element which possesses a certain amount of energizing power, but which by passing in a current tends to create a similar current in the nerves and blood, so as to disperse excitement and congestion from the place where it enters, and to concentrate an excitement and hyperæmia to the negative pole.

While the current is passing there is at first a gentle stimulus, acting on the vaso-motor nerves, and propelling the blood and nervous energy, producing at length a diminution of excitement, tending to insensibility in its course, and a diminution of plethora in the blood-vessels, very beneficial in inflammation, while there is a corresponding increase near the negative pole in sensibility and vascular plethora, the space between the two poles being usually equally divided between the positive and negative conditions on each side of the

neutral point or space. In the positive region an acid condition is developed, oxygen appears if water is decomposed, and the positive electrode may become oxidated, while in the negative region an alkaline condition appears and hydrogen is developed. Alkaline fluids favor solution and decomposition as well as sensibility. The leg of a frog is more sensitive after being dipped in an alkaline liquid. The electric organs of the living torpedo, being the source of positive currents, have been found in an acid condition.

The Faradic or induction currents, being a rapid alternation, develop instantaneous positive and negative conditions at each pole, so that both oxygen and hydrogen are evolved, but as they are in a nascent state, together, they combine and this effect disappears. This alternate action, however, produces an effect on platinum plates, which show a black powder of finely divided platinum in consequence.

The Faradic current has not the suppressing or the developing power of the galvanic, but simply gives us the stimulating power of electricity, which may be so great as to be painful, and which at length exhausts the excitability and paralyzes without producing the alterative, sedative and developing influences of the galvanic current and its chemical action.

As this chemical action is so strong as to decompose water and other compounds, there is no animal tissue that can long withstand its influence. The greater the strength of the current and the softer or more vascular the tissues, the greater is the effect, and it is more efficient in highly-organized, warm-blooded animals. The negative pole produces this decomposing effect, much like the action of caustic potash. But unless the current be very powerful or prolonged, there is no scar left, and the parts return to their natural condition.

The action upon the blood, whether in or out of the body, is to form a small, hard, dark clot at the positive pole from the action of acid, and a bulky, soft, red clot at the negative. Hence electric currents have been used for the relief of aneurisms by forming a clot in the distended artery — needles being inserted as electrodes.

The positive pole is adapted to the transmission of soluble materials into the constitution, and it has been shown that metallic substances in the body may be carried out at the negative pole.

Reuss discovered that liquids pass through porous diaphragms in the direction of the positive current. Where small particles have been observed in tubes, it was seen that a weak galvanic current carried the particles in the centre toward the negative end, the particles at the side being disposed at the same time to move back

toward the positive, but that, as the intensity of the current increased, it by degrees carried all the particles to the negative pole.

When we apply zinc and silver plates to the tongue, or any other metals distinctly positive and negative, there is an acid taste at the zinc and a weak alkaline taste at the silver, with a slight electric current. Such applications sometimes relieve toothache.

Althaus speaks of sensitive patients recognizing a metallic taste from the galvanic current applied to various parts of the body, but he was not acquainted with the fact that sensitives can taste metals in the hands or on any part of the body, independent of electricity. The experience of Bishop Polk, when I met him in 1841, who tasted brass whenever he touched it, led me into the experiments which developed Psychometry. The strong metallic taste from electric treatment of which patients often complain is the effect of the metals through which the current has passed and is a serious objection to the common apparatus.

The acid taste of electricity is independent of any really acid condition, and is perceived even if the tongue and the conductor are covered by an alkaline fluid. It is perceived from frictional as well as galvanic electricity. Some one has compared the acid taste of frictional electricity to vinegar, and that of galvanism to dilute sulphuric acid. In the middle, where two conditions meet, the taste is metallic, — due to metals.

The muscular system is very sensitive to galvanism applied either directly to the muscles or to their nerves, but a stronger current is required for acting on the muscles. Powerful currents, whether galvanic or Faradic, produce intense convulsive action and pain, and one who has hold of the conductors is sometimes for this reason entirely unable to let go.

The action of galvanism upon the muscular system through the motor nerves is not caused by their conducting galvanism to the muscles, but by the excitation of the nerve itself by a current passing along the nerve. Tying the nerve will not prevent the passage of electricity, but prevents the muscular contraction if it be tied below the electrodes. So does anything that benumbs the nerve between the galvanized point and the muscle, such as either chloroform or poisons. A feeble current may maintain muscular contraction, but the galvanic current is not a constant stimulus in proportion to its intensity to maintain the contractions of the muscles — the nerves become exhausted and a variation is required to make the current effective, as in changing the flow or opening or closing the circuit, as is rapidly done in the primary current. Hence the induction currents of Faradic electricity are the most efficient agent for

the muscles, and their rapid alternation maintains a continuous contraction which may become painful. The vibrator may be arranged for slower interruptions, which are often preferable.

The relation of electricity to muscular contraction is such that with very moderate continuous (galvanic) currents, appropriate for therapeutic use, the muscular contraction usually occurs only on closing the direct circuit, and not in opening or breaking it. If this moderate current be inverse it accumulates excitability in the nerve, and hence less galvanic power is necessary in some instances to move a muscle by the inverse than by the direct current. The inverse current does not cause contraction by its passage, for it carries excitability up the nerve, but it occurs on the cessation, by the reaction from the excited portion of the nerve and spinal cord. This is not invariable, however, as in experiments on the legs of frogs, connected with the body only by the nerves, the direct current produces convulsive action and the inverse current produces no motion whatever, but a croak indicating pain. The nerve in this case is not in a normal condition. This local increase of excitability does not appear with induction currents, as they act in an alternating manner.

As it appears to be the general law that more excitement accumulates at the negative than at the positive pole, the negative must therefore be applied to any region which we wish to preponderate, as we apply the positive to any region which needs to be diminished in action or accumulation. The patient recognizes a much more distinct sensation at the negative pole, and long continued or too strong a current will paralyze that portion of the nerve subjected to the negative pole, by chemical action.

The direct current would soon exhaust the central excitability and cease to manifest any effect in the muscles, were it not that the muscles possess an intrinsic property of contractility independent of the nerves, upon which electricity acts. When the current is applied to the nerve the muscle acts in obedience to nervous influence, but when applied directly to the muscular substance the contraction occurs only where the current passes, or where it affects the nervous filaments. All electric action exhausts the nerves in time — a mild current as effectually as a stronger one, if continued long enough.

Galvanization and Faradization have been placed in rivalry by partisans. Duchenne in France insisted on Faradization as the only valuable treatment, and Remak in Germany contended as exclusively for galvanization, which he ably illustrated.

Experience shows the greater therapeutic value of mild galvanic

currents of very moderate strength. Dr. Bird after eight years of extensive experience said, "I am fully convinced that a feeble current if kept up for a long time in certain forms of paralysis (care being taken that the positive fluid traverse the limb in the direction of the ramifications of the nerves) would prove the most important mode of applying this remedy with success."

Althaus says that Faradization "has little or no therapeutic influence in diseases of the nervous centres." Beard and Rockwell say, "for the average constitution and with the exceptions that come from certain idiosyncracies, and certain diseases, such as anæsthesia, the best results of electrical treatment are obtained by *mild* currents. The temptation to disregard this rule and use painful currents is even for the experienced electro-therapeutist very great and sometimes irresistible. The dogma 'no smart, no cure,' which has wrought so much misery in the world, still lingers, even among the intelligent."

Static or frictional electricity when passed through the human body shows similar effects to other currents. There is a paleness produced at the entrance of the positive current, followed by the redness and warmth resulting from reaction, and the chief effects are seen at the negative pole, where the sparks are drawn from the body.

The rational practice, according to Sarcognomy, would consist chiefly in drawing sparks from the back, especially along the spine and on the shoulders.

Frictional or static electricity has been too much neglected for the use of the Faradic form. Dr. Bird thinks the shocks from the Leyden jar just as valuable as Faradization. In amenorrhœa he passes the currents between the poles placed at the lumbo-sacral junction and just above the pubes — or passes electric shocks. He found the shocks very efficient in restoring menstruation when it was not due to the exhaustion of anæmia.

Dr. Bird found static electricity very efficient in rousing the action of the skin, and even exciting diaphoresis, when the patient sits on the insulating stool, and is confident he has produced cholagogic effects by electric shocks through the liver. "I do not think I have ever known it to fail to excite menstruation where the uterus was capable of performing the function," but he is not positive as to any such effects on the kidneys. Sparks drawn from rheumatic joints with recent effusion, until the skin is reddened or papulated, generally effect a cure and absorption of the effusion. The same treatment by sparks from the throat will frequently effect a rapid cure of inflammation of the tonsils. Neuralgic rheumatic pains and

pains in the side in hysterical or chlorotic females are successfully treated by drawing sparks from the affected locality. It has been found useful in muscular tremors, in facial spasm, facial paralysis, and hysterical aphonia and hyperæsthesia.

Frictional electricity has the additional merit of being a copious source of ozone, when the machine is operating, by which the air is purified.

The tendency of static electricity is to operate chiefly on the surface, increasing the sensibility of the skin and the tendency to perspiration; hence it is important in using it to avoid exposure to cold after a treatment of any part, when the liability to catching cold is greatly increased.

The medical use of electricity excited great interest in the middle of the last century, when static electricity alone was known. Quite a number of physicians advocated it and reported their success in curing many diseases. The commission of the Royal Medical Society in France even reported that it was generally successful in the cure of paralysis. Nevertheless it fell out of fashion, probably from universal skepticism, which characterizes the profession, and the lack of wisdom in its application. It is difficult to believe there was any reason for its general neglect and rejection, when its ability so strongly impressed the honest and practical mind of John Wesley, the founder of Methodism, that in 1759 he published a small treatise entitled, "The Desideratum; or Electricity Made Plain and Useful, by a Lover of Mankind and of Common Sense." Wesley's list of diseases in which frictional electricity was useful was as follows:

"Agues; St. Anthony's fire; blindness, even from gutta serena; blood extravasated; bronchocele; chlorosis; coldness in the feet; consumption; contraction of the limbs; cramps; deafness; dropsy; epilepsy; feet violently disordered; felons; fistula lachrymalis; gout; gravel; headache; hysterics; inflammations; king's evil; knots in the flesh; lameness; leprosy; mortification; pain in the back, in the stomach; palpitations of the heart; palsy; pleurisy; rheumatism; ringworms; sciatica; shingles; sprain; sore feet; swellings of all kinds; throat sore; toe hurt; toothache; wen."

But it certainly did fall under the general scorn of the profession, as many other valuable discoveries have done, and those who toward the middle of the present century attempted to use it in their practice had to encounter this contemptuous opposition, as has been well described by Dr. Beard. Its revival in France was ascribed by Duchenne to Sarlandiere's introduction of electro-puncture in 1825, which as a method of practice is of less value than the static electricity which preceded it. Such is medical wisdom! It is certainly inferior

to the application of moist electrodes on the surface except in severe neuralgia, and is of little other use except in treating tumors and aneurisms. As late as 1847, Ranking's Abstract said of the therapeutic use of galvanism: "The subject is manifestly in its infancy, it has met with comparatively little favor either in this country or in France or Germany. . . To the Italians we are mainly indebted for the more recent experiments."

Muscular contractility ceases with death, beginning to decline as the heart ceases to beat, and finally disappearing entirely, always in less than three hours, sometimes in half an hour, so that Faradization of the muscles is a reliable test for death, and might prevent interment in cases of trance, or relieve all doubt in cases of uncertainty. If muscular contractility is entirely gone, death is certain. The experiments of Onimus on the bodies of executed criminals show that the muscles may respond to galvanism after Faradic contractility has been lost.

Muscles put into action by Faradic currents have a sensible increase of heat. In one case an increase of over seven degrees was reported by Althaus. This may be owing to the same consumption of oxygen and destruction of tissue which takes place in ordinary voluntary action, or it may be also the effect of the resistance of imperfect conductors, which is heating. Frogs' muscles when Faradized consume more than twice as much oxygen as when not subjected to electricity. In electric practice general Faradization is very warming, and the action of electricity on the skin also elevates the temperature.

In healthy structures, rather more heat is produced by the direct than by the inverse current. This evolution of heat is caused by both the electric currents and the nervous action, and is not mechanically caused by the friction or pressure or condensation in the muscle contracting. The heat developed is as great or greater when the muscle does not act. It is due to the stimulation of the nerves which control calorification.

Faradizing the spinal cord in dogs so vigorously as to produce tetanic contractions of the muscles, produces a very high temperature in the contracting muscles, and Leyden reports so great an increase in this way that the temperature of the blood was raised nearly nine degrees Fahrenheit. A strong current as from fifty to one hundred cells produces great heat of the skin when applied, and a burning sensation in the flesh, which is intolerable. There is a muscular shock at the moment of contact, and a much slighter effect as the galvanic current ceases. These strong currents produce a feeling of exhaustion and fatigue in the limbs through which they pass.

The galvanic current produces stimulation which varies from a gentle, pleasant warmth to a severe, burning pain, especially when dry electrodes are used. The moderate, continuous current gradually diminishes the sensibility of nerves, and is therefore very beneficial in hyperæsthesia.

The Faradic current may cause a slight pricking sensation or may be increased in effect to severe pain. The effect is increased by the velocity of the intermittence of the shocks. A moderate, rapidly interrupted Faradic current will usually produce in twenty minutes or less a decided benumbing effect.

In applying zinc and silver plates (connected together) to the skin, it has been found that a negative or alkaline condition is produced under the silver plate, and soda is attracted to it, while at the zinc plate an acid condition arises, chlorine is attracted, chloride of zinc formed, and an escharotic action produced on the skin. These results were first observed by Humboldt. The reapplication of the plates renewed the blister at the zinc plate, and the influence of the silver plate was uniformly healing. The subject was more fully illustrated by Drs. Golding Bird and Spencer Wells, showing the chemical action concerned, and the value of the galvanic current in cases of ulceration.

When metallic conductors have a prolonged application to the skin, a small blister containing alkaline serum appears under the negative pole, with an inflammatory areola round it. At the positive pole we find a papula containing acid serum.

The effect of conductors is felt in the skin more decidedly if it be lightly touched. When more firmly pressed the electricity passes into the deeper structures. Faradism acts like other causes of inflammation, in producing first a constriction of the bloodvessels of the skin through their vaso-motor ganglionic nerves, followed by expansion from the exhaustion of the contractile power; erythematous redness and wheals may be produced, and there is a decided increase of heat.

The action of the currents between two plates throws much light on the therapeutic uses of electricity. Dr. Babington placed two slices of muscular flesh between plates of copper and zinc, which were bound together with wire. The weather was warm and another piece placed between glass plates underwent putrefaction while the piece between the metallic plates was preserved. In the course of a few days the decomposition of the salt in the flesh (chloride of sodium) produced a remarkable result. The soda went toward the copper plate and the chlorine or hydrochloric acid toward the zinc plate. The part next the zinc plate was completely hardened, as if

it had been dried, and the part next the copper was almost dissolved by the alkaline action, and covered with a transparent, jelly-like substance. Such is the action of these substances in the body; the chlorine or hydrochloric acid is a consolidating, antiseptic tonic and the alkalies are the solvent elements for promoting dissolution and absorption. The chlorine is developed in the sphere of positive electricity and the alkali in the negative, for the resistance of the nerves and flesh is such that there is no equilibrium produced, the portion adjacent to the positive pole being positive and that adjacent to the negative being negative.

The healing of the blisters under the silver plate induced Mr. Hinton to try the effect on obstinate sores and ulcers, on which he found it had a healing influence, although in one case it caused too much congestion of blood.

Surgeon Spencer Wells had very interesting results from applying oval plates of silver and zinc, from two to four inches long, which were connected by a silver wire soldered to the back of each plate. The experience of this application in seventy to a hundred cases led to these conclusions.

The plates may be applied to the naked surface of the skin without blistering, if the skin be moistened with an acid liquid. But even the ordinary moisture of perspiration will insure a moderate effect. The plate of zinc was always placed above the silver plate as to its location on the body, so that the current passed in the natural, centrifugal direction. If the zinc is placed on an excoriated surface it will produce an eschar in two days, and in about six days it will penetrate through the skin, producing an appearance resembling a slough produced by caustic potash. But this may be avoided by placing the zinc on a sound surface. If the sloughing should be produced by the zinc plate, and its application continued, it will develop a dark, soft, spongy surface discharging a fetid serum. The application of the silver plate, however, produces a more rapid and satisfactory change than the usual methods of surgery. Healthy granulations are produced and simple water dressing completes the cure. The most tedious and intractable ulcers have been speedily healed under the silver plate. But after healthy granulations have been established the silver plate should be removed, otherwise the granulations may become exuberant and flabby, or even fungous, showing an undue determination to the spot. The beneficial influence depends upon the actual passage of the current. For when the current passes down from the zinc to the silver location, through the flesh, it does not act upon a portion of the ulcer below the silver, which may even degenerate while the upper portion is healing. But

if the silver be applied on the lower portion of the ulcer, so as to bring the current through the whole of it, the whole is improved; and any ulcers situated between the plates, in the line of the current, will be healed, but not those outside of the line of the current.

This mild application of electricity by plates was found beneficial by Mr. Wells in several cases of paralysis, and he commends this method decidedly as preferable to the use of batteries. I entertain a high opinion of the value of galvanic plates, and for several years have mentioned and explained this matter to my students, but have not taken time to construct and bring into use the combination of two plates, constituting what has been called the Humboldt battery,— the application of which, guided by Sarcognomy, I consider of great value.

The extreme delicacy of the human constitution shows the importance of delicate currents for therapeutic effects, which will not decompose the blood or promote ulceration. The example of the frog should teach us a lesson. Mr. Wilkinson estimated that the nerves of the frog were more than fifty thousand times as delicate in their sensibility as the most delicate electrometer. Two pieces of silver and zinc with a surface each less than the hundredth of an inch produced violent convulsions in the prepared leg of a frog. This enabled Matteucci to construct the most delicate galvanoscope by placing in a glass tube the skinned hind leg of a frog with a piece of the sciatic nerve attached hanging out, which, when touched with a current of the most delicate nature, such as that between the inside and outside of a muscle, will throw the limb into convulsions. Even the Leyden jar, after it has been discharged and repeatedly touched to remove all electricity, is capable of exciting convulsions in the frog galvanoscope, and Dr. Baconio of Milan made a curious experiment in combining alternate slices of beet root and walnut wood, and conducting a current from this combination by a leaf of scurvy grass to the muscles of a frog, which became convulsed by the contact.

The facts here presented enable us to appreciate the value of the negative pole as a healing agency acting by concentration of circulation and nerve power so as to increase the vital force of the part to which it is applied, yielding an aid less genial than that of the human hand, but still capable of being a valuable therapeutic help in its gentle application, though liable to producing chemical changes in the blood and tissues which might be very injurious if carried far. These decompositions in the animal body are not like decompositions of mineral substance, which cease the moment the current ceases to pass, but continue for some hours after the current has ceased. The

albumen of eggs, the structures of the eye and muscular flesh, when subjected to electric currents, undergo decomposition, more rapidly in dead than in living structures; which develops oxygen gas and acids at the positive pole, hydrogen gas and alkalies at the negative, — causing a froth in the egg and a simmering in muscular substance which destroys its texture. The effects upon the tissues are due largely but not entirely to the acids and alkalies developed; hence they may be counteracted to a considerable extent by introducing carbonate of soda or potassa at the positive pole and tartaric acid at the negative to combine with its alkalies.

The escharotic action at the zinc plate is mainly due to the formation of chloride of zinc, which is a powerful escharotic, and would not occur with a different electrode, though the surface might be blistered.

The reader will bear in mind that when zinc and silver or zinc and copper plates are applied to the human body and connected by a wire, the current flows through the flesh from the zinc to the silver or copper as it does in the cells of the battery. Thus in the flesh the zinc acts as the positive pole of the current, but in the wire connecting them the current flows back from the silver to the zinc. Thus the silver or copper is the positive pole as regards the connecting wires, and in the battery the wire connected with the copper furnishes the positive and that attached to the zinc the negative. In all cases the metal that oxidizes most readily becomes the negative pole of the conducting wires and the other the positive, but when the oxidizing metal is applied on the body it sends a positive current through the flesh.

To apply these principles to the treatment of disease I take two plates of steel (or iron) instead of zinc, the positive, and connect each by a coiled steel insulated wire to a negative plate of the same size composed of aluminum, silver, platinum or gold — thus making two pairs of galvanic plates, one for the right and one for the left side — and fasten them on the surface at the proper localities, moistening the skin if it be dry where they are fastened. They are of course to be applied to antagonistic organs, as we reinforce the organ under the negative pole by influence of the positive upon its antagonist. Thus we may apply the steel plate upon Disease, Melancholy and Sensibility, with the aluminum on Health, Cheerfulness and Hardihood or Heroism. Every physician should have a supply of these plates, especially for sensitive constitutions, and I believe they may occupy a large sphere in electric practice. They will control a great many derangements of the female constitution, and may be used in all cases where such a galvanic current is indicated.

That the galvanic current is a stimulant to motor nerves is

easily shown by the fact that a current applied to the motor nerves of an animal just killed will produce contraction of the associate muscles whether the current be ascending or descending (inverse or direct). But when the vital energy of the nerves has been suspended by applying ether between the muscle and the galvanized portion, or by the influence of woorara poisoning, no muscular contraction is produced.

Currents are produced both by making and breaking the connection, or in other words by the electric change, when the current has a certain intensity. But a strong current flowing continuously will also maintain muscular contraction, though not with the energy of an alternating or interrupted current.

But as the current is a stimulus, its power must have a just proportion to the nervous excitability. An excessive strength in the current will soon exhaust the excitability or paralyze the nerve. Hence the reports of observers have a confused and contradictory appearance, from the different energies and different directions of the currents, which may be stimulant or exhaustive, and which also, if sufficiently strong, concentrate excitability in the direction to which the positive current passes, and either exhaust it in the opposite direction or produce a slight increase altogether when the current is delicate. We cannot specify what degree of electric energy will stimulate and what will exhaust any more than we can tell how much rum will stimulate and how much will stupefy, as the result depends on the individual. A current down the arm will greatly invigorate its muscles, but its increase may paralyze them. In an experiment of Dr. Poore, the man who could only hold up his arm with a weight 6 minutes could hold it 13½ minutes with the aid of a galvanic current down the arm. With a current of a certain strength, difficult to specify, decided exhaustion is produced at the cathode or negative pole, so that this portion of the nerve will not respond, though the nerve may still be active below the part stimulated. It is supposed that this exhaustion is partly caused by the negative development of an alkaline condition, but it is certainly due to a relaxing influence from negative predominance.

The motor nerves of an animal just dead are able to excite the muscles under the influence of moderate currents, either direct or inverse, both at their closing and opening. When the excitability has had time to diminish the direct current produces contractions only on closing and the inverse only on opening. Where excitability is further diminished, the inverse current produces no effect — and the direct only on closing.

This is explained by the fact that inverse currents drive the nervous force from the muscle toward the spine, which reacts when they

cease, and the direct currents send it toward the muscle, and hence are most effective where the excitability is feeble. Inverse currents of sufficient energy send a stimulus toward the spine which makes it more excitable, and direct currents of a certain energy exhaust the spinal power. In man movements are produced on closing the circuit —and if the current be sufficiently increased, movements also occur on opening, and with a greater increase a constant or tetanic contraction is produced.

Beyond these general principles, the details of experiments do not teach us much, as they are more numerous than lucid, and it is not very interesting to study the conflicting reports of Nobili, Pfluger, Volta, Ritter, Fick, Rosenthal, Dubois-Reymond, Eckhard, Heidenhain, Eulenberg, Von Bezold, Cyon, Remak, Ziemssen, Brenner and others, in which we observe the effects of currents of various intensity and duration and of the reaction following in various degrees of vital energy and sensibility. Althaus recognizes the irregularity and departure from general rules in human subjects, both in healthy and nervous conditions.

It is obvious that a current toward a muscle must tend to keep up its activity, and that an opposite current must have an opposite effect, unless it is carried to the spinal cord with sufficient force to stimulate it, which a feeble current would not.

It is true, however, that a weak inverse current generally increases the excitability of the parts above it. A strong current toward a muscle increases its power and endurance, and may prevent fatigue or overcome it when it has arisen, for the current carries blood and nervous energy to the muscle, but when the muscle is completely under a prolonged negative influence it loses its power.

A strong inverse current, which would excite the spinal energy if the negative pole were somewhat obstructed in its access, would not have this effect if the negative pole had better access than the positive, so as to establish an extreme negative condition.

These principles explain many of the reports. Matteucci relieved frogs when tetanized by strychnia, by an inverse current; for the negative pole had free access to the spine. The direct current increased the tetanus because it brought the positive to the spine and stimulated the muscles, yet it would not have been impossible to give relief by a downward current confined to the spine, which should exhaust it. M. Farini relieved a patient from tetanus by a current from the sacrum to the nape of the neck.

Where the sensibility of the nerve has been exhausted by a direct or inverse current it is more sensitive to the opposite. Hence the alternate currents produced by the commutator are of great value.

Flowing between the spinal cord and muscles it sustains both, while the direct current, might, if prolonged, exhaust the spine, and the inverse might throw it into a state of excitement running into tetanus.

The induced current has far greater energy than the galvanic. An induction current from a single cell would be a much more disturbing element than a galvanic current from ten or fifteen. Moreover, being a reciprocating current, its energy as a stimulant is derived mainly from its sudden changes. An electric current makes its chief exciting impression at the opening and closing of the circuit, by the suddenness of the change. The impression at the interruption of the current is weaker than at the beginning. Duchenne estimates the interruption of the current from 120 cells about equal in effect to the beginning of a current from 20. If the galvanic current is designed to produce much effect in muscular contraction it should be frequently interrupted. Hence the Faradic current acts as a very powerful stimulus, which may over-excite and exhaust, unless applied with a moderation that is not always observed, but it has very little chemical and alterative action. The sedative influence of a mild continuous galvanic current (says Onimus) differs from the stimulating influence of the Faradic as much as a warm bath differs from a cold douche.

The Faradic current applied to bloodvessels causes a prompt contraction, diminishing the supply of blood and accelerating the flow, just like any other violent stimulus — or rather it excites the contractility of the vessels so as to accelerate the circulation, but soon over-excites the contractile tissue so as to reduce the calibre of the arteries, and by over-exciting so exhausts their vital energy as to leave the blood vessels in the same paralytic state of expansion which follows the section of their nerves which belong to the ganglionic system. In this it entirely resembles other violent stimulants, such as ammonia and sulphuric acid, which act in the same manner when applied directly to the bloodvessels or to their nerves.

Certain experimenters who did not appreciate the excessive energy of Faradism, reported that its effect was simply the contraction and closing of bloodvessels, but more cautious investigation has shown that it has some power of accelerating the circulation, like the galvanic current, when gradually or gently applied.

Rationally we may presume that a Faradic current being analogous to momentary and rapidly alternating galvanic currents, its influence might be analyzed and understood by studying the action of the galvanic and the effect of interruptions.

As the Faradic is a current of infinitesimal duration, often repeated, its effect must be the same as that of a galvanic current of similar interruptions, if the duration of the galvanic could be made as brief

by a suitable apparatus; but as it is a current of continuity, with a few interruptions or more as we direct, it must produce those effects which belong to continued impression of one kind, while the Faradic produces only the impression of the shocks. Yet machinery might be devised which would prolong the Faradic currents to the galvanic character, or shorten the galvanic current to the Faradic character, with more of shock than continuity. Yet even then the *alternating* character of the Faradic currents would deprive them of the chemical or electrolytic character which belongs to the galvanic, and it would require a nice calculation or adjustment to reduce their electro-motive force to the standard of the continuous current. (Since writing this I find that Dr. Neumann has taken exactly the same view, and made the experiments with suitable apparatus, which give the most perfect demonstration possible, for which he is entitled to the honor of solving a neglected problem.)

Galvanic currents may be made to imitate the Faradic by what is called a commutator or current reverser, of which several forms have been manufactured. With the galvanic battery and a commutator we may readily change from the continuous to the interrupted and the alternating. The alternating current is often desirable. The feature of reciprocity or alternation which distinguishes the Faradic current is not *entirely* absent from the simple galvanic, for the passage of the galvanic current and its interruption produce a reversed current in the patient, which can be demonstrated by taking a galvanic current through the hands and then applying the hands to a galvanometer.

The flow of galvanic and primary currents through the human body is never confined to a straight line. They affect parts far out of the direct line, — farther as they are stronger, — and produce another effect but little understood, by the law of induction, by which every current passing through conductors tends to produce a parallel and opposite current in its immediate vicinity.

In speaking of Faradic currents, for comparison we refer to the pure induction current of the second coil, for the current of the first coil or primary current is not a pure induction current, but a compound of galvanic, magnetic, and inductive influences — that is to say, it *is* a galvanic current, but is modified by its position in a coil, and by the reaction of the magnet. Hence it differs materially from the current of the second helix, which is a pure induction current, with the intensity and the perfect alternation of movement which we associate with the idea of Faradism, while the current of the first helix, with less intensity, from its shorter, coarser wire, has also no reciprocity of effect, being a one-way current. The primary galvanic current, upon which all depends, would be scarcely felt at all by the

patient, — it is only the magnetic energy and the breaking which impresses him. There is also an induced current in the primary wire, called the extra current, produced by the action of the primary coils on each other, and flowing in the direction opposite the primary current, but what part this bears in the general result has not been clearly explained.

The difference in the currents is partly due to the first helix being composed of shorter and thicker wire, which gives it a greater power of transmission, while the second helix, of much longer and finer wire, transmits less electricity with greater tension. The difference between the first and second helix currents is, according to Duchenne, as great as that between warm and boiling water. Yet writers often neglect to mark this difference, and speak of Faradization without mentioning the very important point, whether they are using the primary or secondary helix current, — the primary being mild and analogous to the galvanic, while the secondary is the harsh and overpowering current which requires so much caution. This current makes a strong impression on the skin, which can be carried to the production of acute pain, but produces no other disturbance than a slight erythema. The second helix current is very powerful in this respect, and is very efficient in neuralgic affections and cutaneous anæsthesia. It has also greater power of penetrating the muscles than the first. The action is superficial when dry electrodes are applied on a dry skin, — more penetrating when broad, moist electrodes are applied firmly to the surface.

The character of galvanic currents and their relation to the Faradic have been well illustrated by Onimus and Legros. They have shown by numerous experiments that a moderate galvanic current in the centrifugal direction, that is, in the direction of the flow of the arterial blood and the nerve forces, uniformly accelerates the flow of blood, and increases the action of the bloodvessels, so as to cause greater fulness of blood and greater blood pressure in the parts which the arteries supply, but that the reverse or centripetal current, against the flow of blood and nerve power, diminishes the flow of blood and the blood pressure, though not as much as the centrifugal current increases it. A current from the neck of a dog to the portion of the brain exposed by trephining the cranium, caused such an increased flow to the brain as to make it project beyond the limit of the opening.

The galvanic currents are both more gentle and more permanent in their effects. That they are also more congenial to life is shown by their effect on the ciliary motions. Onimus and Legros placed on a glass plate the vibratile epitheliums of the frog and subjected them

to galvanic currents. The ciliary movements were notably increased by the galvanic currents. When they had become slow, they were revived when the current started. Induction currents, however gentle, checked the movements and soon abolished them. They were, however, gradually revived by the galvanic, after the cessation. Similar experiments were made on the ciliary bodies from mammalian animals. Spermatozoid bodies subjected to the same experiment manifested the same difference of effect from galvanic and Faradic currents, but not to the same extent.

In attempting to check the ciliary movements by a continuous current in the opposite direction to their waving motion (which might be called relatively an ascending current), they found that, instead of checking, it accelerated the motions.

Gentle galvanic currents have the characteristic of a healthful stimulus, in the fact that they promote normal processes and make an impression which does not exhaust vitality and cause an immediate collapse, but continues for a time after the application. The increased salivation caused by a galvanic current applied to the salivary glands continues for twenty-four to forty-eight hours. Mantegazza observed great increase of digestion in the stomachs of frogs under the influence of galvanism, and a similar observation was made by Onimus and Legros in the stomachs of dogs, which they inspected through a fistula. These effects are developed at the negative pole of the galvanic current, which attracts the sanguineous and nervous flow, while the positive pole diminishes the afflux and vital activity.

"The influence of electricity on organic bodies is prolonged more or less beyond the direct action. It is not the electricity that cures, but the modifications it produces. When the nerve cells are excited, they become a centre of activity. It is an error to believe that continued currents act only during their application."

The genial influence of galvanic currents on the muscular system enables one to do more work, and when already fatigued it diminishes or removes the fatigue.

The value of galvanism for the muscles was well illustrated by Dr. Poore in his text book of electricity. He says: "There is no more important effect of the constant current than what may be called its *refreshing* effect. Heidenhain succeeded in restoring the excitability of the muscles of an exhausted frog, by passing a strong galvanic current through them. This fact has long remained without any practical application of it."

"The first patient in whom the author observed the refreshing effects of the current was one who suffered very acutely from this feeling of fatigue, and always expressed great satisfaction during the

employment of the current, and frequently used the words 'comfortable' and 'pleasant' to express his sensations. He also often said 'that seems to give me strength, — to give me a sense of power in the arm.' The number of elements employed was sufficient to cause an appreciable but not painful sensation to the patient. This seemed to help the supinators over their difficulty, and the patient continued to pronate and supinate his hand, without the least trouble, saying at the time that 'he could do it much easier when the current passed,' and also that it 'seemed to give him strength.'

"The author found another (also suffering from writer's cramp) who said precisely the same thing, that he could accomplish repeated muscular acts with far greater ease during the passage of a current, and that after the employment of the current he had a feeling of strength and power in the arm. He was a medical man himself accustomed to the employment of electricity."

To test this matter by experiment he asked a patient to hold a weight out horizontally with his left arm. In four minutes he had to complain on account of the fatigue and pain; then, after applying the positive rheophore in the axilla and the negative on the painful muscles, he promptly said: "All the fatigue is gone; I feel just as though some one had given my hand a support." Subsequently the same patient supported a weight on his left hand, but could hold it only six minutes. The next day the arm was galvanized, and he was asked to repeat the experiment. While it was in progress, a galvanic current was occasionally passed down through the fatigued muscles, and he sustained the same weight thirteen minutes and a half.

"Similar experiments to these (says Dr. P.) have been tried on several of the author's friends, and they all tend to show that the endurance of voluntary muscular action is enormously increased by the passage of a continuous current, and that the feeling of fatigue both during and after the prolonged effort is mitigated or entirely obviated. Experiments have also been made, and with results which tend to show that the force as well as the endurance of voluntary muscular action is increased by employing a galvanic current." His experiments on himself in squeezing a dynamometer with the hand, with and without galvanism, showed an aggregate of 667 pounds of force without galvanism and 908 pounds with it.

These effects are explained by the increased afflux of blood and nerve force caused by the galvanic current.

The action of Faradism on the muscles is that of an exhaustive stimulus. Dr. Poore says: "Select a small muscle, * * Faradize it, using a current of sufficient strength to cause a contraction which is too forcible to be overcome by the will, and it will be found that after

three or four minutes the contraction becomes less and less strong as the irritability diminishes, and that the will is soon able to overcome the artificial contraction, while the same current applied to the corresponding muscle in the opposite hand causes a contraction against which the will is absolutely powerless. Ultimately the Faradized muscle will refuse to respond either to mental stimulation or to Faradism."

"M. Vulpian found that when a strong Faradic current was applied to the heart of a dog, rhythmic contraction at once ceased; violent tremor of the cardiac walls occurred for three or four minutes, followed by a slight trembling for the same space of time, and then all movement ceased. The muscular substance *became pale*. When all movement, even fibrillary, had ceased, in the ventricles, their walls seemed to have lost almost entirely their contractility. When touched again with the rheophores, there was not the slightest contraction, nor did stimulation by rhythmical impression by the hand reproduce their movement." This result was entirely independent of the pneumogastric nerve, and when that nerve was paralyzed by atropine it made no difference. It would be well for every practitioner to realize the influence of each current on himself before applying it to a patient.

The great dispersive power of electric currents where they enter the body necessarily renders it possible for them to be used to the extreme interference with, and suspension of, all vital processes. The continuous current passed for a sufficient time through the limbs of an animal, or through the nerves, produces even paralysis, and its action upon sensitive nerves is quite benumbing.

An electric current carries osmosis with it so effectively that when two masses of liquid are separated by a porous membrane, an electric current will carry the fluids from the compartment which receives the positive pole to that which receives the negative, which will thus be raised above the level of the other.

The action of the positive pole being dispersive as to fluids and nervaura, is at the same time consolidating or contractile to the tissue, hardening the substance as if by the influence of chlorine. The negative pole, on the other hand, has a solvent influence on solids, promoting dissolution by alkaline action. Hence the advantage which I believe electro-therapeutists have not sufficiently observed, of alternating currents in opposite directions. The negative pole, assisting in the dissolution of morbid structures, and bringing into play the alkaline action which is nature's great agent for absorption, while the positive pole applied to the collected fluids disperses them. The galvanic action is so powerful, chemically, that in an experiment of Sir H. Davy with 150 pairs for five days, upon muscular

fibres, all the alkaline elements were carried over to the negative pole and all the acids to the positive.

When the object is simply to restore a healthy action and disperse morbid conditions, as in treating tumors, the dispersive energy of the positive pole is more efficient than the vitalizing energy of the negative. Onimus passed a galvanic current through two tumors that were equal in size and large as an egg; the one to which the positive pole was applied made greater progress in healing than the other, but both were cured. The dispersive action of the positive pole is very valuable in counteracting inflammation and pain. Dr. Reliquet describes a case in which a very painful and irritated bladder, containing a large calculus, was relieved of pain and spasm by a galvanic current, the positive pole being in the bladder and the negative on the abdomen. Electro-therapeutists have recorded a great number of similar facts.

As to *overcoming pain*, Dr. Poore says: "It would almost seem to be one of the most powerful anodynes which we possess, and its power in this respect is hardly as yet fully appreciated by the profession. In the out-patient room we have been accustomed for some time past to try the effect of the continuous current upon pain of all kinds, whether depending on some obvious organic cause or not. In many cases we have found that the pain has been alleviated, and in a large proportion of these it has been absolutely *cured*.

"When one is using electricity for the treatment of pain and other subjective symptoms it is often a good plan to begin with a mock application of it, and in this way see how much of our result is due to the patient's imagination and how much to electricity.

"All three forms of electricity are employed for the relief of pain, but the most generally useful for such purposes is undoubtedly galvanism."

The positive pole is most generally applicable to the relief of pain, but there are also conditions which are benefited by the application of the negative, when there is no hyperæmia or active irritation.

Dr. Anstie, who considered *Faradization* useless in neuralgia, said: "The constant current is a remedy for neuralgia unapproached in power by any other save only blistering and hypodermic morphia, and even the latter is surpassed by it in permanence of effect."

Evidently the enlightened physician who knows how to combine electric and medical influences, who can send in the influence or the substance of cocaine, theine or morphine in combination with the galvanic currrent, has a great advantage over those who know nothing of this combination. They can apply the remedy in their electrode by passing the current through it, or they can apply it on the sponge

through which the current is passing, with absolute certainty of relief.

Dr. A. recommends applications of five to ten minutes, never beyond fifteen. He would include the morbid part between the poles or apply the negative nearer the spine. He does not find the electric treatment of much service in cervico-occipital neuralgia, yet some cures have been reported.

On the other hand Dr. A. D. Rockwell says: "There can be no question that galvanism has a far wider range in this direction than Faradism; yet in consideration of the fact that the latter has been so much ignored, it seems necessary to say a word in its defence. My experience will not allow me to doubt that Faradism is not only invaluable in many forms of pain, but in certain conditions relieves where galvanism is not only useless but worse than useless, since it serves only to exaggerate the existing distress. True neuralgia as defined by Anstie is without doubt most successfully treated by galvanism, while hysterical neuralgia and the so-called pseudo-neuralgias which are simply forms of pain, occupying certain areas, and running seemingly in the direction of certain nerves, yield most readily to Faradism. . . . In the great majority of cases of neuralgia, where firm pressure over the affected nerves aggravates the pain, the galvanic current is indicated, while the Faradic current has the greatest power to relieve, when such pressure does not cause an increase of pain."

"General Faradization is to me absolutely indispensable in the practice of electro-therapeutics." He considers the constant current of more extensive application, but Faradization is used in one-third of all his practice. "There is no one tonic influence in medicine comparable with it in power, none to which can be accorded such a wide range of application." "In submitting a patient to general Faradization, . . the hair being thoroughly wet, the hand is passed with firm pressure over the entire surface of the head. In treating the forehead, which is far more sensitive to the current than any other portion of the body, the operator should first press his moistened hand firmly over the part, and then make the connection with his other hand on the sponge of the positive pole. The strength of the current can be sufficiently regulated by increasing or decreasing the grasp of the positive pole held in the right hand."

[These are excellent suggestions, but Dr. R. seems quite unconscious that he was using as much animal magnetism or nervaura as electricity, and perhaps in some cases more. There are great numbers of rational practitioners who would relieve by such an application of the hands without using an electrode, and in using the

electrode, Dr. R. pretty effectively limited the access of the positive current by obstructing it with over five feet from one hand to the other, thus placing the patient under control of the negative pole, and extending the negative influence into his right arm, while he supposed himself to be giving a positive current to the patient.]

"An application of the Faradic current to the head in many forms of neuralgia, nervous headache and insomnia, if properly given, is capable of affording instant and most grateful relief. There are very few, however, who administer it with any degree of precision and skill, and as a consequence we witness aggravation instead of relief of pain. The slightest concentration of current in such situations as the forehead is capable of exciting pain, even in the normal condition, while a proper diffusion over a broad surface, with equal and gentle pressure, affords a sensation as agreeable as it is curative."

Dr. Rockwell attaches great value justly to the use of the hand as the electrode, but appreciates it only for mechanical reasons, not understanding its nervauric value. He has been fortunate in discovering the tonic regions indicated by Sarcognomy, as follows:—

"The back part of the head and upper portion of the spine (cilio-spinal centre) will usually bear powerful applications, and it is an interesting and important fact, that applications to this centre *will produce far greater tonic effects* than when the pole is applied to any one other portion of the body. Care should be taken to avoid all bony prominences, since slight currents in these regions give great pain." "There is no remedy to the effects of which there is such a varying degree of susceptibility as to this. Not until the patient is submitted to a careful electrical test can we be sure that what we might consider a very gentle treatment will not be too severe for the case in hand."

Dr. Rockwell is almost as strong an advocate of Faradization as Duchenne. He says: "On the temperature, the effect of general Faradization is to lower it, when abnormally high. It also acts as an equalizer, and patients who suffer from cold feet and creeping chills over the body become sensible of a feeling of warmth even in the midst of a seance. General Faradization has very little influence on the normal pulse, but its power to reduce the frequency of the beats when it is abnormally high, in conditions of nervous exhaustion, is distinctly marked. In the treatment of such cases I have, in a seance of five minutes, frequently tested a fall in the pulse beat varying from ten to thirty to the minute. At the same time the heart's action becomes more regular and stronger. An almost invariable accompaniment of general Faradization and central galvanization is an improvement in sleep. . . A better appetite and increased

power of digestion, although not observed so early in the treatment, is a pretty constant symptom, while through the direct mechanical effects of the current on the intestines, and its influence over the secreting processes, more or less temporary and permanent relief is afforded in constipation. The influence of general Faradization over nutrition is perhaps in no way more marked than in the occasional increase in the size and weight of the body, so rapid and perceptible to the eye that it need not be confirmed by reference to the scales. Finally, through tendencies, both direct and indirect, to improve nutrition, we observe increased disposition and capacity for intellectual and physical labor." Of course these beneficial effects are due to moderate and prudent use of Faradism, especially when combined with the personal influence of the operator.

But such treatment is a very blind and emphatically empirical business. The operator rambles all over the body without knowing just where the several effects are developed, — like a savage thumping the keys of a piano and developing accidental melody. The comfortable repose is developed just behind the arms ; the increased nutrition is developed at the upper exterior part of the thigh, and on the dorsal region ; the relief of constipation comes through the lower dorsal and lumbar regions ; the improved appetite through the lower dorsal and upper abdominal regions ; the relief of the heart through the shoulders and upper dorsal region ; the lowering of the pulse through the foot, tibial region, Relaxation and Tranquillity.

Duchenne says : " In progressive muscular atrophy, muscular Faradization will sometimes arrest the progress of the wasting, and will even *develop the muscles* that are on the way to destruction. In glosso-labio-laryngeal paralysis it improves for a time the articulation of words and the deglutition. In locomotor ataxy, electro-cutaneous Faradization often cures local anæsthesia and consequently much diminishes the functional disorders that it occasions when seated in the extremities. It sometimes causes the disappearance of fixed cutaneous hyperæsthesia. Faradization of the eye may *arrest atrophy* of the papillæ of the optic nerve ; and lastly, Faradization sometimes cures or removes paralysis of the motor muscles of the bladder, rectum and other viscera."

Nevertheless he believes that in spite of the temporary relief locomotor ataxy and glosso-labio-laryngeal paralysis will not be permanently cured. Remak and other advocates of galvanism, however, claim the absolute cure of locomotor ataxy by their methods. In writer's palsy he has had no success. In facial neuralgia he believes galvanization curative, but has not succeeded with Faradization. In

rheumatic contractions continuous currents produced improvement only, and cures were completed by *Faradizing the antagonists.*

Galvanization by permanent, continuous, uninterrupted currents for a period of half an hour to several hours he has found very valuable in promoting absorption, "In chronic articular affections with nodosities, ganglionic tumors, and in *atrophy of the deltoid*, produced by rheumatism." In such cases, he says, "I have covered the greater part of the cutaneous surface corresponding to the diseased organ or region with a moist rheophore (a plate of platinized copper covered with wet leather), and I have placed a second moist rheophore higher up, at a point as near as possible to the former; then for half an hour or an hour, according to the tolerance of the individual, I caused the passage of a permanent continuous current from ten, fifteen or twenty elements. I have had no occasion but to praise, in their way, the catalytic effects of this mode of galvanization, and although they are usually very slowly produced I have obtained a complete cure on several occasions."

This is a process "which Faradization is unable to replace."

Cutaneous galvanization Duchenne pronounces very inefficient, but cutaneous *Faradization* highly effective, "when it is wished to produce upon the skin, either for a moment or during several hours, a more or less powerful revulsion which may be graduated from a simple tingling to a sensation greater than that produced by fire without producing the least electrolytic or calorific alteration. I have seen it cure angina pectoris, and very painful sciatic neuralgia, which had resisted all medication; while by lesser degrees I have successfully treated more or less grave neuroses and nervous maladies." This merely illustrates the effects of counter-irritation, by any strong application to the skin, in relieving subjacent organs.

In overcoming *contractions* both galvanism and Faradism have succeeded. In the case of Mad. X., sixteen years of age, after an injury of the right hand producing severe pain in the wrist resulting in contraction of the muscles of the forearm, for which eminent physicians were unable to do any good, the pain at length extending to the shoulder and dorsal region and the contractions extending up the muscles of the arm, the pain producing loss of sleep, galvanization, extensively tried, enabled her to open and shut the hand, but could make no further improvement, when Duchenne applied local Faradization to the *antagonists* of the contracted muscles, with vigorous currents and rapid intermissions, and in half an hour all contractions were gone and she could write and play the piano, which had been impossible for two years. Twelve seances quadrupled the strength of the flexors of the fingers. In a subsequent partial

attack, which all medical means failed to relieve, the same treatment overcame the contractions, and electro-cutaneous excitation over the seat of the spinal pains diminished them, but the spinal pains returned and electricity could not relieve them. This case illustrates the necessity of not relying solely on either current. Meyer reports that contractions are cured both by induction and by constant currents, "but they were generally removed surprisingly quickly by the latter, even after they had existed for years."

There appears to be a sympathy between antagonistic muscles through their nerves, which made such a cure possible, and which Remak has illustrated by producing contractions of muscles when he galvanized their antagonists, which he called galvano-tonic contractions. Duchenne recommends the alternate use of galvanism and Faradism in the contraction arising from cerebral causes.

The harsher character of Faradic currents sometimes renders it impossible to employ them at all. Duchenne, the chief advocate of Faradism, says: "I could mention one of my confreres and friends, who cannot submit to electrization without experiencing vertigo, dazzling, etc., however feeble may be the electro-physiological effects produced in him." There must be something objectionable in its nature, when such a case could occur as appeared in the clinique of Andral, in which a girl of sixteen with a spinal disorder "was so sensible of the electric influence that she recognized the very faintest currents when applied to the diseased side; although the phenomena occasioned by the same currents when applied to the sound side were scarcely appreciable. Every time that she was exposed to the Faradic current, however feeble, and for however short a time, she suffered for a long period afterwards from pains in the head, disturbance of vision, general malaise, a stitch in the side, and a redoubled occurrence of vomiting, to which she had long been subject." After referring to this case, Duchenne says: "Faradization is a two-edged sword; however, by proper circumspection we may always avoid danger."

The harshness of its action is illustrated by his statement: "It is possible to apply Faradization at once to the upper and lower limbs, and in a more general manner, by placing both hands in a basin of water communicating with one of the poles, and both feet in another basin communicating with the other. This method excites the nervous centres, and especially the spinal cord, in a very general and energetic manner, even when the current is of small intensity. If the *intermissions are rapid*, all the muscles of the limbs are *thrown into tetanic contraction*, and the accompanying sensation, which is felt chiefly in the joints, *is very painful*. At this degree of intensity, this method of electrization is *followed by severe lumbago*."

This suggests the question why M. Duchenne is so devoted to Faradism.

Duchenne also relates the case of a medical student who attempted to follow the directions given in his writings, and Faradize himself to complete his restoration from an attack of apoplexy and hemiplegia, a year previous, as his movements were still irregular. "Having put in action an induction coil with intermittences (by a trembler) of *great rapidity*, he took one of the metallic cylinders in each hand, so that the current passed through his brachial nerves from end to end. At the moment when it began to pass, his hands closed with great force and he was unable to relinquish the cylinders. Feeling then that his paralyzed limb was contracting very painfully, he had the presence of mind to overturn the Bunsen's pile with his foot. The current was stopped instantly, but it was too late. Its action, though continued only for a few seconds, had already occasioned serious injury. The head was extremely painful, the contraction extended to the whole side, and the poor fellow, who was alone in his room, was found an hour later in convulsions upon the floor." He came very near dying in the hospital, and when he left was in much worse condition than before he tried this Faradic experiment on himself.

Of this case Duchenne says: "I have come to the conclusion that *localized* applications are in such cases simply useless, but not dangerous when made with circumspection. At the commencement of my researches I often Faradized by reflex action the antagonists to the contracted muscles of hemiplegic patients, and I sometimes *had occasion to repent* doing it, so that it is necessary to be cautious in the employment of a method that has proved to be so dangerous." "Electro-dynamic baths, given in a dose *so feeble as not to provoke muscular contraction*, produce an excitation that increases muscular force in certain forms of general paralysis."

That such effects are best produced by the galvanic current has been shown by Onimus. In the discussion between them Duchenne says: "There is certainly no need of experimental medicine to inform us that, in its therapeutic aspect, localized Faradization is a two-edged weapon. Empirical clinical observations soon convinced me, at the beginning of my electro-therepeutical researches, that localized Faradization, if applied to a muscle or nerve in too full a dose or for too long a time, may increase or even *produce paralysis or atrophy*, instead of curing either."

To vindicate his idea of the equal safety and benefit in the induced currents to which he is partial, Duchenne reports comparative experiments which he thinks satisfactory, but which really show the superior mildness of the galvanic.

His *weakest possible* Faradic current, after being reduced still further by passing through about eight inches of water, produced greater exhaustion of the nerves of a rabbit in *half a minute* than the strong galvanic current did "during the whole time of the experiment," which did not exhaust them at all.

When the rabbit's nerves had been an hour previously exhausted by a strong induced current, but had recovered tone, and brought the vessels into a normal condition, the same *extremely reduced* Faradic current produced *immediate* exhaustion or paralysis of the nerves, and "dilatation of the vessels, which rendered their finest ramifications visible for three minutes." Hence we may say that debilitated nerves do not bear well the mildest possible Faradic currents.

We need no better demonstration of the superior safety and healthfulness of the galvanic current than these facts from the champion of Faradization. The ganglionic nerves on which these experiments were tried run to the finest capillaries, as shown by Ordonez, Gimbert and Schweigger, — consequently whatever affects them affects the entire circulation in every part of the body ; and it has been shown by Onimus and others that a mild galvanic current promotes the circulation in a normal manner when it follows the course of the vessels, and consequently has great restorative power.

The effect of Faradization for paralysis, Duchenne says, is an increase of redness, warmth and sensibility, and gradually the enlargement of the cutaneous veins, which often continues after Faradization, "and sometimes increases, so as to resemble an irritation, and to require the suspension of treatment and the use of emollients, baths, poultices and the like," which proves Faradization a powerful irritative stimulant.

This discussion leads into profound physiological questions as to the controlling forces of the circulation, in reference to which some very eminent physiologists, I think, have shown a lack of the definite conceptions of physical science.

It has been established that the action of the ganglionic nerves, when irritated, so contracts the bloodvessels as to diminish the circulation, and when their vital power is exhausted, the bloodvessels, unable to contract, *yield to the pressure of blood which is always present* and become greatly expanded, — also that the parts become warmer with this additional supply of blood, uncontrolled by their ganglionic nerves.

In all this there is nothing to modify or confuse the simple physiological truth that the involuntary ganglionic system sustains and regulates *the entire circulation.* It maintains the contractions of the heart, and the contractions and peristaltic actions of bloodvessels, which

as we descend in the animal scale become more and more capable of assisting the heart, or even dispensing entirely with its aid. When we feel the throbbing of bloodvessels distinctly localized under the influence of emotion, or arising in very small arteries without apparent cause, we realize the absolute control by which the ganglionic system sends out and distributes the blood.

There is nothing in these intelligible and simple facts to require or justify the hypothesis (or rather assertion) of Claude Bernard that there must be active *dilation* of vessels, as well as an active contraction. Active dilation or expansion of muscles and the vessels on which they operate is purely imaginary. No one has ever seen or measured an expansive force in muscles. We know of no such thing in physiology as an expansive energy, — all energy is contractile. The heart has an *apparently* active expansion of its ventricles, which might throw up a weight resting on them, but it is due entirely to the systolic *contraction* of the auricles, the ventricular muscle being entirely passive in the diastole. There is as little reason for supposing an active dilation in the bloodvessels as in the heart, — the conditions are identical. There is no dilation except where it is forced by the pressure of a fluid propelled by contraction. The climax of this absurdity is reached when Duchenne says that the normal calibre of the vessels depends "upon a certain equilibrium between the tonic force of the constrictors and *that of the dilatators*." The tonic force of dilation exists only in an unscientific imagination,* and the bastard word *dilatator* is appropriate to such a conception.

But although there is no dilation by the energy of dilating or relaxing fibres, there is a dilation by nervous influence, and when Bernard says "I have proved by direct experiment that there are two orders of vaso-motor nerves, acting in opposite directions, and that their properties are in the majority of cases called into play by reflex influence," he states his facts correctly but misunderstands their meaning. He says: "The great sympathetic has the function of a moderator of the vessels, — when irritated it produces a more or less considerable contraction of them, a contraction which forms a certain degree of impediment to the circulation, and hence diminishes its speed." This is a very incomplete statement. Irritation of the ganglionic nerves to a moderate extent does not diminish but increases the circulation. They are not *merely* a "*moderator of the vessels*," but give

* The small longitudinal and oblique fibres which M. Gimbert professes to have found in some arteries, and which Duchenne professes to regard as a confirmation of his theory, are quite irrelevant. Such fibres act like all other muscles by contraction, not by expansion, and while they are well adapted to promote the peristaltic action and propulsion of blood, they can contribute nothing to dilation unless by holding the vessel in shape as the blood pressure dilates it.

the impelling energy of the vessels, and *all that sustains the circulation,* which M. Bernard overlooks in this statement. "On the other hand (he continues) by exciting the filaments of the cerebro-spinal system we produce a dilatation of the same vessels. Such is the whole mechanism of the nervous influence. *With these two modes of action alone* — contraction and dilatation of vessels — the nervous system *governs all the chemical phenomena of the ogranism.*" ! ! !

It was said that sometimes even Jupiter nods, and surely in this case M. Bernard was a little oblivious. He overlooked the fact that besides simple contraction and expansion there is a peristaltic action propelling the fluids and producing an increase of blood pressure, well shown in the experiments of Onimus and Legros, and well known otherwise before their experiments. The active throbbing determination of high inflammation is quite beyond M. Bernard's contracted theory.

The assertion that by *vaso-motor contraction* and expansion "the nervous system governs all the *chemical* phenomena of the organism" is too extragavant to be noticed if it did not come from so eminent a physiologist. Brown-Sequard adheres more faithfully to the facts when he puts aside this theory and says "the nervous system acts directly and originally upon *the parenchyma of the tissues,*" instead of limiting its action to bloodvessels. He adds that when a nervous influence produces inflammation the principal agency is not the increase of blood but the influence on the tissues. (Lectures on Central Nervous System.)

But that the cerebro-spinal system is concerned in dilation is entirely true. This is in consequence of the general law which places the motor and the sensitive systems in antagonism in function as they are in position. Sensitive nerves when strongly impressed overcome the motor energy. Pain to a sufficient extent prostrates every muscular power. The pneumogastric, being a sensitive nerve for the interior, shows the same influence upon the heart, not by any direct excitement sent to the heart, expanding its substance, according to the Bernard conception of active dilation, but by its central end, when disconnected with the heart by section, conveying a sensitive impression to the medulla, which causes exhaustion, and if sufficiently potent may cause death. To carry out his hypothesis, for it is nothing more, Bernard maintains that certain small ganglia in the organs have the function of paralyzing or relaxing the vaso-motor nerves. If so, they must be sensitive ganglia, and sensitive structures may *excite* as well as relax. Nature is not so awkward as to construct one organ *merely* to oppose another.

It is not because they are cerebro-spinal, but because they are sen-

sitive nerves, that certain nerves cause relaxation of the bloodvessels, as when a slap reddens the surface. For the cerebro-spinal is the dominant system, in connection with the seat of life, and by its sensitive capacity receives impressions which it reflects on the bloodvessels to accelerate or retard the circulation, which fact was expressed in the old physiological principle "*ubi irritatio, ibi affluxus.*" The spinal cord is the centre from which every impression is reflected, and vital changes produced, not merely, as Bernard would have it, by active contraction and *active dilation* (which is imaginary), but in addition by peristaltic propulsion, by calorific control, suddenly increasing or diminishing the heat at any point, and by other occult influences that increase, diminish or prevent nutrition and secretion, which will never be understood until medical science rises out of the low mechanical rut into which it has fallen, so that it can comprehend the influence by which the chorda tympani and trifacial excite the salivary secretion, and the lachrymal gland responds to a certain frontal convolution, as I have proved.

The marvellous powers of the nervous system in controlling growth and changes are so far beyond anything that the bloodvessels could explain, as to prompt the theory that there are special trophic nerves which, though they have never been discovered, Duchenne, Samuel and a few others believe to exist.

Upon this speculative question I would respectfully offer my own suggestions. The cerebellum is the especial organ of unconscious life, — the trophic centre of the whole person. It is also greatly concerned in muscular action. Hence the two functions are associated closely, and Sarcognomy shows us Vital Force, a very muscular energy, situated in close proximity to Nutrition on the body. We may therefore expect to find the trophic power associated closely with the muscular.

Again, it is sensibility that makes the body liable to injury, waste, disease and death, which are resisted by hardihood and other occipital powers. The intellectual and sensitive powers are *anti-trophic* and wasteful of tissue.

Again, growth is a vital process, not a passively receptive one. It belongs to the efferent, centrifugal energies, not the afferent centripetal. It must therefore affiliate with the muscular rather than the sensitive apparatus. It must associate with nerves that carry an influence from the centre to the organs, not with those which carry inward sensations. Hence, if we look for trophic nerves, we should look for them in connection with the motor nerves and in connection with those portions of the cord which are most closely connected with the cerebellum.

This would explain the influence of muscular exercise on growth and the beneficial effects of muscular Faradization and galvanization. Future experiments in medical practice will show the power of growth developed by currents to the cerebellum and to the upper exterior part of the thigh.

The calorific changes and the nutritive changes are not at all proportional to the changes in the bloodvessels, and M. Duchenne though a partisan of Bernard's most erroneous ideas, states some well-known facts which entirely refute them. He says that to accept a certain theory, "it would be necessary to forget the experiments which show that this kind of neuro-paralytic hyperæmia is passive, and that in itself *it is powerless to affect the nutrition;*" which is very true, but totally refutes Bernard's idea that this hyperæmia is what controls nutrition, and is the only way, as it increases or diminishes, by which the nervous system "*governs all the chemical phenomena of the organism*"!! What a passion our great mechanical physiologists have for reducing nature's most mysterious operations to some simple mechanical arrangement. Duchenne states some facts which show that mere hyperæmia does not produce inflammation.

Faradization by strong currents on the neck is not free from danger, especially on account of the sensitive character of the pneumogastric nerve, which runs in company with the carotid arteries and jugular veins, and which, when excited centrally, tends to depress the action of the heart. Duchenne says: "The procedure is not always free from danger. Whilst moving a rheophore over the lateral and superior parts of the pharynx, with a current of rapid intermission but moderate intensity, the patient fell suddenly into syncope. When restored, he said that he had experienced a kind of suffocation, and an indefinable sensation. Since then, having Faradized the pneumogastric many times at the same height, with one intermission per second, and with a very moderate current, the same accident has not occurred, but the præcordial sensation has been felt every time. I once saw the necessary caution neglected in Faradizing the pharynx of a young man, in whom that organ and the velum palati were paralyzed, consecutively to an angina. A profound syncope was immediately produced by the operation, and in this case I have no doubt that the pneumogastric had been irritated by the current. Faradization of the pneumogastric at the lower part of the œsophagus may be practised without inconvenience." It is farther from the region under the jaw which disturbs the brain.

The location of the organs of the brain shows that there is something more than pneumogastric excitation in such cases. The pharyngeal region cannot receive electric stimulation without affect-

ing the brain unfavorably if prolonged, and the medulla oblongata, as well as the Pons Varolii, is too near this location to make strong currents judicious. The suffocative effect was produced through the pons, which controls respiration. The paralytic tendency of this region is shown in diphtheria.

Experience has abundantly illustrated the comparative value of galvanizing and Faradizing in paralysis, quite differently from the doctrines of Duchenne. In a case reported by Baierlacher, a workman in a factory, aged 28, had a paralysis of the face of eight weeks standing. He was treated with strong induction currents for three weeks without any change, when a galvanic current from fifteen elements was applied and "produced strong contractions in all the muscles." "After only three applications of the continuous current to the nerve trunk and muscles, considerable improvement was manifest, and after four more applications the paralysis had almost entirely disappeared."

Dr. Neumann reports that in the case of a man of 60 years, with rheumatic facial paralysis, accompanied by severe pain, the induction currents were employed for six weeks every day for half an hour without any success. He then employed the continued currents and produced very great amelioration.

When the muscular action was restored, the Faradic currents were capable of producing light contractions in the paralyzed muscles, but much more feeble than in the sound ones, while the galvanic currents produced much stronger contractions in the late paralyzed muscles than in the sound ones.

Meyer relates the case of a woman of 48 years, the left side of whose face had been paralyzed fourteen days and was not affected in the slightest degree by induction currents, while a battery of six Bunsen cells produced strong contractions, — stronger than on the sound side. The excitability to electric currents diminished as the cure advanced, and when discharged cured, in the third month, "the excitability (of the left side of the face) for either induced or continuous currents was wholly wanting." Two years later the electric excitability was partially restored.

Why is there so great a difference in the effects of the two currents? The galvanic currents by their continuity produce an accumulated effect, due to quantity and duration. The Faradic currents are instantaneous and contradictory or alternating in course. Their intensity excites and disturbs, but their brevity forbids the production of effects that result from prolonged action, hence they fail to rouse the paralyzed muscles, which are slow to respond, and will not respond to the flash of an induction current. But nerves

and muscles in a state of healthy excitability respond promptly to Faradism, which is a more muscular influence than galvanism. "On sound muscles in the normal state (say Onimus and Legros) the continued current, applied directly to the muscles, produces contractions with great difficulty. When the electrodes are placed on the course of the motor nerves, the contractions are stronger, and produced by a weaker current, but *never as strong as with induction currents.*"

It has been found by Neumann, Bezold, Bruckner and Fick, that a galvanic current, when frequently interrupted, produced less and less effect on the impaired muscles as the interruptions were more frequent. A feeble current, sufficiently prolonged, surpasses the effects of the strong interrupted current. Every interruption diminishes the effect. This shows that the galvanic cannot always be replaced by the primary which is an intermitted current, and hence I have modified the common portable battery to allow the primary to be changed into the galvanic.

While the effect of interruptions is recognized unanimously as an impairment of the motor effect, in *paralytic conditions*, that does not appear to be the sole cause of the difference; for galvanic currents, interrupted even more frequently than the Faradic, will produce contractions when the Faradic fail. When Faradic currents fail to produce any contraction in consequence of ten or twelve interruptions per second, galvanic currents succeed in spite of twenty interruptions per second, for the galvanic currents occupy all the space of time between the interruptions, while the Faradic have only a *momentary* duration.

In this respect, the Faradic current is far more objectionable than the *magneto-electric*, which approximates the interrupted galvanic in its duration, for the magneto-electric current is passing while the magnet is near the iron, and if the revolution be made very slowly the current is prolonged in proportion.

In a case of paralysis of the facial nerve (reported by Onimus and Legros), the paralyzed muscles contracted under a current (from ten to sixteen elements Remak) which was not sufficient to produce any contraction in the sound masseter muscle. The effects were more apparent when applied to the muscles than when applied to the nerves. But the Faradic currents, as strong as they could be borne, producing very energetic contractions in the sound muscles, entirely failed to produce any effect *on the paralyzed muscles.* On the other hand, it required nearly twice as strong a galvanic current to affect the sound as the paralyzed muscles. The induction currents are therefore unfit for application to paralyzed muscles. But is this

unfitness absolute and inherent? Does it not arise from the small quantity and great intensity of the induction currents, as well as their brief duration? An apparatus which gives a large quantity of electricity without sudden interruptions would approximate the galvanic in its influence. For this purpose, in a magneto-electric machine the wire should be thick and short, and the magnet should be strong and rotated very slowly. But even thus arranged such a current is of very little value for paralyzed muscles.

Paralyzed muscles require a larger quantity of electricity, — a larger surface of the cells under chemical action; sound muscles require intensity or number of plates rather than quantity of surface. As paralyzed muscles recover, the galvanic current has less effect, and the effect of the Faradic current increases. The contractility of paralyzed muscles under galvanism is much like that of the involuntary fibres, slow and progressive, not ceasing quickly. The galvanic current produces additional contraction after the muscles have been fatigued by the Faradic current.

The continuous current is efficient for paralyzed muscles, even when interrupted. Onimus and Legros, with fourteen elements of Remak, produced strong contractions in paralyzed muscles, and eighteen days after the attack even sixty interruptions to the second did not prevent them. On the sound side of the face, similar currents produced tetanic contractions of the muscles, which indicates that Faradic currents fail, not so much by the number of interruptions as by their lack of continuity, lack of quantity and antagonistic alternation.

In the above case a feeble galvanic current of four to six elements produced contraction of the paralyzed muscles, which were not affected by the interrupted current. The galvanic is especially adapted to exhausted excitability, and is more effective than the Faradic several hours after death, but not at first. It acts best where there is but slow contractility, as in paralyzed or dead muscles, or those of non-striated fibre, on which it acts efficiently, where the Faradic generally fails. In very young or embryonic animals, galvanic currents are efficient, but the Faradic soon lose their power.

The galvanic currents act directly on the muscular fibre, the Faradic on the nerves. The action on the muscle is strongest at the negative pole, where alkalies are developed. When the nerves are paralyzed by poisons, the muscles do not respond to Faradism but do to continuous currents, and appear to respond more readily when isolated from the influence of the nerves. In fact, the muscular excitability and response to excitants is greater, independent of the nerves, than when associated with them. A muscle

which contracts normally from the current proceeding from sixteen elements will (according to Onimus and Legros), when deprived of its nerves, contract from four. In a case reported by Zeimssen, in which the facial nerve had been *completely divided*, and the muscles consequently paralyzed, the nerve had entirely lost, after three weeks, its electric excitability, except that the galvanic excitability lingered in a small branch. The muscles responded to a continuous current with a slow contraction passing into a tetanic condition.

Those cases in which the galvanic current alone can produce contractions are generally farther advanced and slower in recovery than when the induction current can produce contractions.

Muscular irritibality, which may be considered a morbid condition, as seen in cramps, increases when the nerves are enfeebled or injured. Convulsions are a mark of weakness in the nervous system. In the sound nervous condition muscles do not contract when struck, but they do when their nerves are impaired and the fibres act independently.

In regard to the questions we have just considered, Ziemssen says: "This difference between the action of induced and continuous currents, very generally stated by Remak, has since become the subject of numerous and searching inquiries. The great and general result of these inquiries is the following: in completely paralyzed muscles and nerves, the excitability for battery currents is sometimes retained or even increased, while the excitability for induced currents is completely lost. In such cases the curative action of the continuous current is superior to that of the induced. With the return of mobility the excitability for both kinds of currents commonly changes."

The reason of this must be found in the superior vitality, delicacy and quickness of the nervous system, compared to the muscular. The instantaneous Faradic impression rouses the nerves, but the more prolonged galvanic is required by the muscles. The ten-thousandth part of a second is sufficient for a current to stimulate the muscular nerves of a frog, according to Matteucci.

A very important difference between the galvanic and Faradic currents is found in the far greater penetrative power of the galvanic.

Helmholtz says, in a lecture delivered at Heidelberg: "Recent experiments made in the physiological laboratory on the transmission of excitation in the nerves have called my attention to the fact that the intermittent currents of electric induction produce but little effect on nerves situated at a certain depth in the human body, although it is easy, with a battery of ten or twenty elements of zinc

and platina, to produce in the same nerves excitements even of a tetanic character." Experienced electricians find no difficulty in impressing the spinal cord by galvanic currents along the spine. Onimus and Legros say that they have obtained the same effects by exterior currents, as when the spinal cord was exposed in animals.

The Faradic currents, with their greater intensity of contractile energy, do not promote the circulation either of blood or of nerve power as does the galvanic current, which has the advantage of flowing in one direction and, when centrifugally applied, assisting equally the flow of blood and of nervous force from the centres to the circumference. Hence it promotes many vital processes and increases the secretions when Faradism fails. Onimus and Legros caused a free salivary secretion by galvanism applied *directly* to the salivary glands, but the induction current had no such effect.

The centripetal galvanic current, on the contrary, retards the flow of blood, counteracts the natural peristaltic action of the bloodvessels and diminishes the nerve energy of the periphery or destination of the nerve force and blood.

The Faradic resembles a combination of the centrifugal and centripetal galvanic currents, — a combination of stimulants and sedatives or rather accumulative and dispersive currents for the periphery, and also a combination of cumulative stimulants and dispersive sedatives for the central regions. Hence it neither propels the vital force outwards to tranquillize the centres, nor concentrates the vital forces from periphery to centre, but leaves the *balance* undisturbed, and simply amounts to a general stimulus along the line of the current, which increases the contractile energy of the bloodvessels and increases the blood pressure until, in a few minutes, the exhaustion of contractility leaves the blood pressure to fall, as was shown in the forty-sixth experiment of Onimus and Legros on a dog.

As a powerful stimulus wherever applied, when not carried too far, and when carefully adjusted to the conditions of the organs, Faradism is surely of great value. When applied from hand to hand, from hands to feet, from shoulder to calf or to thigh, it is a powerful renovator of energy, and when applied locally on muscles it stimulates and warms them and assists their development. When applied from the muscles to the spine or their spinal nerves, its frequent interruptions maintain contractions which become more sustained as the shocks are more frequent, allowing no relaxation until, if sufficiently frequent, the contractions become extremely painful and, as Duchenne says, may even produce shortening when the shocks are sufficiently rapid and often repeated. The effects of the rapid Faradic shocks are very much like those of muscular exercise and contribute to the

growth of the muscles and to their habitual tonicity. The effects of cutaneous Faradization are also more intense upon the skin in proportion to the rapidity rather than the intensity, and such currents are the most efficient in cutaneous anæsthesia. There is also an anæsthesia in which the muscular sense is lost, resistance cannot be felt, and it is difficult to regulate the movements except by eyesight. Duchenne speaks of a patient relieved by rapid Faradism, who could not feel the bed on which she was lying, and felt as if suspended in air unless she saw the bed.

Our repeated cautions against heroic Faradism require that we should look on the other side of the question and remember that currents of great strength may be required, when masses of cellular and adipose tissue stand in the way of the current, or when vitality is at so low an ebb as to require the utmost power of stimulation. During the terrific cholera epidemic through which we passed at Cincinnati in 1849, the eclectic physicians saved many that seemed to be in a hopeless collapse by using the most concentrated and fiery stimulants known in the materia medica, which might have endangered the life of a man of health, but barely roused the sluggish and benumbed sensibilities of the moribund patients. In similar conditions a Faradic stimulus, dangerous under ordinary circumtances, may become necessary. In extreme cases of paralysis, where sensibility, contractility and nutrition seem entirely gone, violent Faradization makes very little impression, because there is no sensibility to feel it; and Duchenne properly says: "In such cases it has been necessary to have recourse to an apparatus of enormous intensity, and I have even had to regret the want of one still more powerful. It was only after I had recalled some life to the limbs that I was able to diminish the intensity of the current and that an apparatus of medium power became sufficient."

Faradism being an exciting stimulus at the point of its application and on the line between the electrodes, this stimulation along the line of the current corroborates the impression at the site of the electrodes; for if we examine the cerebral organology we shall find that organs lying intermediate between any two possess an intermediate character, and resemble respectively the organs to which they lie nearest. Hence, in the organology of the body, the currents passing between the locations of any two Faradic electrodes contribute to increase the effect which the locations of the electrodes would produce.

The application of Faradism or induction currents to the human body is therefore a simple matter. It merely demands that the stimulating electrodes shall be placed wherever a stimulus is re-

quired, and that it shall be so graduated by the gentleness of the current, by the *breadth* of the electrodes, and by the medical or carbonic character of the electrodes themselves, as to insure that gentle impression which will assist and not over-excite the vital functions. The simplest precaution which can be adopted against the energy of the current is the use of large sponge electrodes, well saturated with water or with *salt* water, when we would increase the freedom of the current. I would recommend, however, as better than salt for the medication of the water, the use of muriate of ammonia, which will answer the same purpose in increasing the conductivity, and which has in itself much virtue as a vital stimulant and general promoter of the secretions. Its influence is so wholesome that it would not in any case be objectionable. An additional means of moderating and refining the influence of Faradic currents will be found in the application of broad carbon plates on the surface under the electrodes, by which we may secure *any degree of mildness.*

When the Faradic or galvanic poles are placed near together, the current flows with great energy through the short connecting space. Hence this method is highly available for strong localized excitement. When they are placed farther apart the diffusion of the currents is much greater and their density where they pass much less. But in all cases the effect of any current is determined according to Sarcognomy by the location of the electrodes.

The medication of electric currents, which the medical profession generally have ignored or derided, is an important part of a rational practice, whether the medical substances can or cannot be carried into the body by electric currents. Whether metallic poisons can be removed from the body by a current that may be safely borne is a different question. It is far more difficult to find and remove from the body the infinitesimal quantities of metal which may be in it than to carry in a portion of the substances in solution through which a current is sent, yet metallic substances have often been expelled. Onimus and Legros say that almost immediately after a few drops of a solution of iodide of potassium have been injected under the skin of a rat, iodine can be evolved at any part of the body by the application of the positive pole of a galvanic current.

It is desirable that electric currents should resemble as much as possible, and assist, the natural influences of life. To do this they must be extremely gentle, for the more delicate galvanic currents promote and assist peristaltic action in the bloodvessels and in the intestines, but the currents usually applied do not. Even Faradic currents (from the second helix) may be made sufficiently gentle by using a rheostat, a cylinder of water or a large carbon electrode or large sponge

to moderate the current to prevent its interference with the peristaltic action.

Electric currents altogether wholesome and congenial are a grand desideratum in electro-therapeutics. Moderate galvanic, primary and secondary currents through proper electrodes (large sponges or carbons) are desirable; but there is an irritating quality in the currents commonly used, which renders them after a time intolerable, and fills the patient with a metallic taste and feeling. This is due to the law — not yet recognized — that electricity carries with it the potentiality of all the substances through which it passes, and when it passes through zinc and its compounds, sulphuric acid and bichromate of potassa, its influence cannot be genial.

Hence I have been accustomed to prefer cells that rely upon muriate of ammonia, a thoroughly wholesome substance, and one which produces less active chemical influence and does not consume the zinc when not in use. The ideal cell, however, should substitute iron for zinc, though it may have less electro-motive force. It is an easy matter to give a larger surface, or use a larger cell, or increase the number of our cells. Iron does not appear to be available, as it corrodes too rapidly.

Moreover, all the objectionable influences of a strong electric dynamic current can be overcome by medical means. Water alone, liberally used in the sponges, has a happy effect. The fluid extract of scutellaria on the electrodes will neutralize nearly all that is objectionable in a current from a sal-ammoniac cell, and for sensitive, irritable constitutions, the addition of a little hyoscyamus to the scutellaria will make it pleasant. Medicines may be contained in a properly constructed electrode or in the sponge, or may saturate a cloth upon the skin, under the electrode. The irritative effects are still further controlled by association with magnetism.

Although the galvanic currents directly applied may suspend peristaltic action, their application to the nervous system promotes it. Galvanism of the splanchnic nerves produces peristaltic action, but Faradism does not,— showing the former to be more genial. Faradism excites contractions of the stomach when applied through the pneumogastric nerve, and may be used to excite vomiting. Galvanism applied in the same way diminishes or suspends its contractions, opposes vomiting, and may be used against seasickness, as it has been, successfully, when applied on the epigastrium, by Dr. LeConiat.

Galvanism has an antispasmodic influence. Though it disturbs at the beginning and at the end of a current, it promotes tranquillity while flowing; but Faradism, being a rapid succession of beginnings and endings, is essentially disturbing. The chemical influence of the

galvanic current is greater when it flows uninterruptedly; the sensitive influence is greater when interrupted. The chemical and heating effects are more conspicuous at the negative pole, which is generally more distinctly felt.

The superior value of galvanic currents is owing to their adaptation to controlling circulation, excitement and nutrition. As Onimus and Legros express it, "the interrupted currents and the static electricity are *excitants*, and never can be anything but excitants; but the continuous currents, according to the mode of application, may act as a powerful sedative and at the same time favor the interior nutrition. They are calming, as they maintain the nervous system in the same dynamic condition and favor the normal state of the circulation, and we know that the best calmant for the nervous system is a well-oxygenated blood."

This statement is too exclusive, as static electricity, in which they do not seem to have had much experience, is much more than a mere excitant, and has a great variety of effects, according to the mode of application. Faradic electricity is more than a mere excitant, as it has shown the power of promoting growth in puppies, and invigorating feeble constitutions. But we cannot repeat too often that the effect of every current is determined according to Sarcognomy by the *location* to which it is applied.

Galvanism has a special relation to the most tenaciously vital structures. In cold-blooded animals, especially frogs, we find the most tenacious vitality. They survive centuries of underground confinement in rocks, and their nerves and muscles furnish us the most perfect and delicate of galvanoscopes. The involuntary contractile tissues in man approximate the conditions of cold-blooded vitality, having a tenacity of life which is shown by action after the voluntary system is entirely lifeless. After death, when the voluntary muscles cannot respond, and even the intestines do not respond to direct galvanizing, they still respond to galvanism of the mesenteric nerves.

The less any structure is under the influence of the will, the more capable it is of post-mortem action, and the more tenacious of its organization. The bones are the most durable part of the body, and the uterus outlasts all other soft parts under circumstances that favor decay. Atrophy from inaction is the characteristic of the voluntary muscles. Voluntary structures rapidly decline and are very slow to regenerate or repair injuries, which the involuntary easily repair, as they have something of the qualities of cold-blooded animals, with an inferior nervous development. Voluntary structures are closely associated with the central nervous system, and respond more promptly to their nerves than to action on their substance.

When the voluntary muscular system, by impairment of its nerves in paralysis, approximates the condition of the involuntary non-striated fibre, responding but slowly to its nerves, it is then peculiarly accessible to the galvanic influence, and contracts in the slow and prolonged manner characteristic of involuntary tissue. The galvanic current restores from paralytic conditions where the Faradic is useless.

The peristaltic action of the unstriated fibre of the intestines is promoted by galvanizing the splanchnic nerves or the mesenteric plexus, but Faradization of the splanchnic nerves does not promote peristaltic action. The Faradic current when applied on the intestines does not produce any natural peristaltic action between the poles where the current is passing, nor even contraction, but simply produces, like any irritant, a sharp contraction at the points *where the electrodes are applied.* Hence, when applied to overcome constipation, the electrodes should glide over the surface in the direction of the natural movement, — especially on the descending colon.

According to Onimus and Legros the galvanic current, in direct application to the intestines, promotes contraction or tension as it ascends, and relaxation as it descends. The relaxation, however, is favorable to evacuation. The best action of the galvanic current for constipation is on the spinal cord and splanchnic nerves. Its application between the mouth and rectum, in either direction, promotes peristaltic action, as it stimulates the ganglionic and spinal nerves. Constipation has been successfully treated by introducing one metal in the mouth and the other in the rectum, connecting them with a wire. Silver or copper may be used with zinc. The well-known experiment of moving the bowels by a galvanic current from the mouth to the anus is practicable only with galvanism. This experiment was successfully performed by M. Leroy d'Etiolles as well as by Aldini and others. With the Faradic current no such result occurs. Duchenne made the experiment on horses, with one electrode in the mouth and the other in the anus, and produced tetanic contraction in the limbs and the bowels, but no evacuation. In one case the body of the living horse was laid open for observation at Montfaucon, but he gained nothing by the cruel experiment. The Faradic current, applied as before, did not produce any appreciable contraction, no matter what its intensity, even when violent contractions, amounting to opisthotonos, were produced. The result was equally nugatory when the same experiment was tried by Duchenne upon a patient. It was certainly taking a great liberty with the patient to apply a method which had been proved fallacious.

There is little harmony or clearness in much of the confused mass of experiments by electro-therapeutists, and our views become clear

only by adopting the principles of Sarcognomy, which show that a galvanic current may be useful in constipation by alternate currents to the spine and the gastro-intestinal tract, and that when the negative pole is on the spine it accumulates a vital force which overcomes any derangement, but when it is on the abdomen, along the gastro-intestinal tract, it produces a more active manifestation, which gradually exhausts the vital power.

Our comparison of galvanism and Faradism thus far develops the superior mildness of the former, and its more general harmony with vitality. The valid objections to therapeutic Faradism arise from its abrupt harshness and ability to injure, but these may be removed by diminishing the force and increasing the softening or checking influences at the electrodes by water, by carbon or by medicines, and by giving them greater breadth of application to the body. There is a great difference between small metallic electrodes placed near together and large sponge or carbon electrodes placed far apart. Meyer regards the current as most curative which produces contractions with the least intensity.

The carbon electrodes are much the best in common use. The greater their breadth of surface the less the intensity of the current. The dryness of the skin may be overcome by a strip of wet flannel or of wash-leather tied over the face of the carbon, which answers the purpose without the inconvenience of a wet sponge. When it is desired to concentrate the current upon a small space, as a nerve or a muscle, an olive-shaped electrode is used, — or even a smaller point, if necessary. For applications to the skin alone, dry electrodes are used, and a metallic brush or a roller is the most efficient channel. The roller covered with wet cloth or leather is useful for *labile* (moving) currents. The *interruption* of galvanic currents may be made by an interrupting electrode, or a pedal interrupter worked with the foot, — or the operator may pass the current through his person and touch a suitable electrode with his finger or with a thimble worn on it. The interruption may be conveniently made by a loop of wire held in the hand and vibrated against the conductor of the battery, included in the loop.

The very delicate electric practice which is appropriate to sensitives is not in fashion among electro-therapeutists — Onimus and Legros say : " Induction currents of extremely feeble intensity have a different influence on the tissues from what they have when of medium intensity. In employing an induction current which is barely perceived by the tongue, of the least intensity that we can produce with our ordinary apparatus, and which is transmitted through several inches of water, we attain different results. We can observe this difference

in studying the movements of the heart ; but these are exceptional facts and this mode of employing electricity occurs only in laboratories, — never in the practice of medicine."

Is it not obvious that we need a material change in our electrical appliances ?

Having discussed the relative merits of galvanism and Faradism, or the current of induction, coming from the exterior coil, let us now consider the intermediate magneto-galvanic or primary current, which comes from the interior coil. The primary and secondary currents are frequently spoken of as being *both* Faradic, and their distinction overlooked, which is very important.

The primary or magneto-galvanic current from the interior coil is intermediate in character between the galvanic and Faradic, and if I were confined to one current alone, I should select the primary. It has the galvanic character in being a one-way current, tending toward sedative effects at the positive and developing at the negative, while it has the stimulating influence of the Faradic from its rapid interruptions. It is usually given from a single cell, which has the force of one or two volts. The cell current alone would be of little value and almost imperceptible, but by creating magnetism as it flows in a coil round an iron rod, it receives the impulsive force of the magnetized rod (a magnet being competent to start an electric current), and by the rapid interruptions of the flow (as the magnetic attraction moves a spring and interrupts the current) it acquires the stimulating quality which the Faradic owes to its frequent interruptions, but still retains to a great extent the peculiar virtue of the galvanic current. Hence it has a more general availability than either of the other currents. By commutation, which is alternation, it becomes a double stimulus like the Faradic, with somewhat less irritability, and by slow interruptions it approaches more nearly the galvanic character. The rapidity of the vibrations is usually regulated by the screw, and the strength of the current by advancing or withdrawing the exterior coil, or by moving the metallic cylinder which interrupts the inductive action of the interior on the exterior coil, or upon the magnet.

When a strong resistance is to be overcome it is sometimes necessary to use more than one cell to supply the galvanic current, but one cell generally supplies all that is well borne in passing through the human body. An extra cell may be required when a rheostat is used, or when the current is used to convey medical potencies, or is sent through the entire length of the body, or through more than one person.

The primary current carefully managed is available for the treatment of the brain as well as the body. It is an interesting and won-

derful course of experiments which I have been accustomed to make on impressible constitutions, and which most of my students have personally realized, by stimulating the brain with the negative electrode. Even while this page was being written I received a call from an intelligent gentleman (J. H.) of substantial but impressible constitution, and to show him the use of electricity stimulated five organs of his brain successively, the effects of which he described as satisfactorily as if he had known their functions, in a very graphic manner.

In the next chapter I shall show the extreme facility with which in impressible constitutions we may illustrate the laws of Sarcognomy by means of electric currents, which modify mind and body at the same time. There is every grade of impressibility, from such conditions to that of those in whom we produce physiological effects on the body, with very slight apparent effects on the mind. As there is no human being who can resist the power of electricity, there is no one on whom we cannot demonstrate Sarcognomy, and hence I think it very important that all students of Therapeutic Sarcognomy should be familiar with the power of electricity.

But I find it will be impossible in this volume to give a full development of the subject, and will close this introductory view with the remark that the practitioner should have the galvanic, primary and secondary currents in use, — and our portable instruments are now supplied with another, the combined primary and secondary, which is the most powerful of all, and combines the influences of primary and secondary. Notwithstanding the singular assertions of Heidenhain as to the superior penetrative power of the galvanic, it is easy to demonstrate the superior penetrative power of the primary, secondary and combined currents, which (especially the latter) will play efficiently upon a group of persons who would not feel the galvanic current. Static electricity also occupies the entire field of practice with superior convenience and pleasantness, and it is sufficient to say, without enumerating the diseases, that there is nothing in the way of human disease and suffering to which electricity may not in some form be an important aid or cure.

CHAPTER XXIII.

THE EXPERIMENTAL INVESTIGATION OF MAN AND DEMONSTRATION OF SARCOGNOMY.

BY ILLUSTRATIVE EXPERIMENTS.

In bringing before the reader the solid basis of the new Anthropology in the experimental method, which is destined to be the future basis of philosophy, it is proper to show its superiority over the methods of the myopic investigators whose vast and multitudinous labors heretofore have been so unsatisfactory and shown how unprofitable are the immense labors of those who reject enlightened methods and, with a jealousy appropriate only to mediæval barbarism, *reject the testimony of honest investigators* too scornfully even to investigate a demonstrated success.

Optimistic readers may think it wrong to comment on medical barbarism, but I do not wish to convey the idea that this medical barbarism is anything peculiar to the profession, or anything more than a special expression of the general inherited barbarism of the century, apparent alike in all classes, in governments, universities and churches, which require centuries to outgrow the psychic force of the dark past.

The barbarian form of thought is scornfully jealous of human testimony when it urges any essential change or promises any brilliant progress, — especially when the methods are not physical but psychic. There is an irreconcilable hostility between barbarian and psychic thought. The barbarian mind enters the psychic field only to devastate it into the barren desolation of the hopeless metaphysics which has heretofore been called philosophy, as it enters the physiological field to cultivate the most obscure regions of pedantic research without regard to their real value, — preferring the discussion of some unimportant appearance half revealed by the microscope to a discovery of the fundamental laws of life and principles of therapeutics. It prefers to use the animal intellect of the senses rather than the human intellect which develops philosophy, and, having no ethical inspiration, it is utterly reckless in the infliction of suffering.

Hence, instead of experimenting upon well-developed man, in whom

psycho-physiological life may be revealed, it prefers to torture animals, *seeking physical phenomena alone*, and evolving from the laboratory full of howling animals an unprofitable record of half-understood, if not delusive, experiments. The world must decide between this barbarian method and that which is presented in my discoveries.

VIVISECTION A FAILURE. — The failure of barbarian vivisection was very easily and happily exposed by Caroline E. White in the *Forum* of March, 1890, from whose trenchant essay I make a few quotations as follows: —

"When we began this controversy, some eight years ago, we were met by our opponents with an astonishing enumeration of immense benefits gained for the human race through experiments upon animals. 'How can you,' they said, 'object to vivisection, when to it we are indebted for the discovery of the circulation of the blood, of the double function of the spinal nerves, of the treatment of popliteal aneurism, of vaccination and of the anæsthetic properties of ether and chloroform.' When it was shown that not one of these discoveries was due to experiments upon animals, they were forced to quit the field for the nonce; but rallying under new banners, on which are inscribed Pasteurism, Listerism, ovariotomy, brain localization, microbe theory, etc., they seem prepared to do battle on new ground."

But both Harvey and Sir Charles Bell denied that their discoveries were due to experiments on animals, and Bell says that he experimented on animals only to convince people when he could not convince them in any other way. The treatment of popliteal aneurism was known long before the experiments on animals by Hunter. Jenner discovered vaccination, not by such experiments, but by the experience of milkmaids. Anæsthetics were discovered by American experiments on living human beings. Ovariotomy was shown by Sir Spencer Wells to have had nothing to do with experiments on animals, and in reference to BRAIN LOCALIZATION — in which my experiments have the unanimous corroboration of all who are much acquainted with them — it is sufficient to say that the vivisectors have utterly failed to discover the chief functions of the brain, WHICH ARE PSYCHIC, and have sought only the anatomical and physiological phenomena, with results which prove their fallacious method, for their inferences present a Babel of contradiction — in which Ferrier, Munk, Goltz, Schiff, Hitzig, Fritsch, Nothnagel, Sottman, Carville and Duret, etc., are in irreconcilable contradiction.

As a specimen of the results of this blind and fallacious method, to which it may be said the entire medical profession is committed to-day by its colleges, let me quote what Prof. Munk says in "*Die*

Functionen der Grosshirnrinde" in reference to Ferrier, who is really the ablest and most successful of modern vivisectors of the brain, viz. :—

"All these statements and what depended on them as to the character of the disturbances induced by the operations, and recovery from them, were, as I said before, worthless, capricious interpretations of the phenomena, for the animals were examined by Prof. Ferrier in a quite inadequate manner, and scarcely at all except at the time of general depression of the functions of the brain. If I had gone too far in making this declaration when I had only glanced through Ferrier's work, I should at once have repaired the wrong. But instead of that, as the experiments have turned out, I said rather too little to you then, for Ferrrier had not been lucky enough in his guesses to hit the mark even once, and all his statements have proved themselves false."

I think this is unjust to Prof. Ferrier, but when two of the leading vivisectors find their experiments flatly contradictory what is such a method worth? and what is the value of a method of exploring the psychic organ of the body by a method which IGNORES ITS CHIEF FUNCTIONS and looks only to its subordinate functions, which are physiological, and in doing that falls into endless contradiction?

It claims success in locating cerebral diseases, but when Dr. Bennett stated, in 1884, that an epileptic patient had a tumor in the upper part of the fissure of Rolando, the surgical operation of Mr. Goodlee found it "under the gray matter of the ascending frontal convolution," which in a well-developed head would be three inches away from the supposed location.

The veteran BROWN-SEQUARD has shown, in his indefatigable researches, a host of facts which seem to contradict nearly everything that the whole corps of vivisectors profess to have discovered. The vast ocean of cerebral science, a larger area than all the old physiology, cannot be explored by using such a single plank for the voyage as vivisection.

Here I might dismiss the claims of the colleges of the nineteenth century to reveal the mysteries of life by means of vivisection, but as the merits of this fallacious method are vigorously maintained by other false pretensions, to prevent the public indignation from closing the laboratories of torture and cruelty, it is worth while to show that vivisection has been one of those delusions which have so often misled the profession.

Prof. Lawson Tait, F.R.C.S., of Edinburgh, the most eminent living ovariotomist and skilful surgeon, is in favor of the total abolition of vivisection, as a method of no value to the progress of

medical science. He said in a letter published Dec. 12, 1881: "Like every member of my profession, I was brought up in the belief that by vivisection had been obtained almost every important fact in physiology, and that many of our most valued means of saving life and diminishing suffering had resulted from experiments on the lower animals. I now know that nothing of the sort is true concerning the art of surgery; and not only do I not believe that vivisection has helped the surgeon one bit, but I know that it has often led him astray."

These are not the opinions of theoretical extremists, but of the soundest practical men. Sir Charles Bell ("On the Nervous System") said: "The opening of living animals has done more to perpetuate error than to enforce the just views taken from anatomy and the natural sciences."

Dr. Henry J. Bigelow, an eminent surgeon of Boston, said in a public address: "How few facts of considerable value to our race have of late years been extorted from the dreadful sufferings of dumb animals, the cold-blooded cruelties now more and more practised under the authority of science."

Sir Wm. Fergusson, an eminent surgeon, in testifying before a Royal Commission, said: "I am not aware of any of these experiments on the lower animals having led to the mitigation of pain, or to improvement as regards surgical details."

G. Macilwain, F.R.C.S., maintained that vivisection had hindered more rational methods of research, and produced great practical mischief in surgery, of which he gives an example in the experiments on dogs to determine the value of "acupressure" instead of the ligature for closing arteries. It was supposed to be successful, but proved a failure, and was abandoned for the reason that experiments on dogs do not illustrate the constitution of man; and yet this miserable method, which cannot even illustrate the vital processes of an artery, is the great reliance of the medical profession for illustrating the laws of the human brain, while *ignoring its chief functions.*

It ought to be a final deathblow to this medical folly that the Royal College of Surgeons in London a few years ago decided not to allow experiments on animals in the new building about to be erected, and not to allow the funds to be used for any such experiments elsewhere.

The failure of vivisection leaves nothing but the meagre results of pathology, the dissection of morbid brains, to elucidate the mysteries of life, and no one well acquainted with its progress would believe that pathological dissections could in a thousand years demonstrate the functions of the brain.

The hopes of mankind must rest upon the revelations of PSYCHOMETRY, which give us the function of every locality, and the confirmation of these revelations in experiment upon the living man in his most rational normal condition.

The following experiments are given as an illustration of the development of local functions in impressible constitutions. I do not affirm that such results are readily obtainable from all persons, but that a large portion of mankind — from one-fourth to one-half, and in hot climates nearly all, are capable of presenting these phenomena.

MISCELLANEOUS EXPERIMENTS.

IT is easy for those who wish to realize the truth of Sarcognomy to do it by the use of electricity upon an impressible temperament. I will briefly describe some of the experiments with which I instructed my class, June 6, 1889, nearly all of whom realized similar psychic influences in experiments on the body.

Dr. P., a very intelligent and well-educated practising physician having a well-developed and well-balanced head, consented to undergo the experiments, dressing in a suitable operating robe.

The positive pole was first applied by himself to the hypochondria while I held the negative upon the healthy region of the shoulder. This he readily realized as an agreeable, bracing influence, beneficial to the whole person, and somewhat alterative in the abdominal region.

Then the positive was applied upon the intellectual region of the sternum and the negative behind the middle of the arm on the trunk, producing, as he described it, a bracing and intellectual influence at first, with a gradual diminution of the intellectual activity after the first minute, as the influence of the current was established.

The negative was now transferred to the lower tibial region, and the effect was a prompt diminution of intellectual action and a cool, sleepy feeling.

The positive was next applied in front of the ileum (the melancholic region) and the negative in the axilla, with the production of a very pleasant, quiet, cheerful feeling, less vigorous than the influence of the shoulder.

To show the effect of Faradic currents properly applied, the Faradic electrodes were applied upon the shoulders (the Health region), producing a very beneficial, bracing influence, with more quietness than when the hypochondrium was touched by the galvanic current. Applied next upon the lower margin of the ribs on each side (Region of Irritability), the effect was very disagreeable, disturbing and nervous.

They were then placed upon the shoulder to stimulate the region of Patience or Serenity, but proved to be decidedly stimulating and stirring, owing to being placed too near the base of the neck so as to reach the passional and turbulent region of the brain. Moving them about an inch farther out, the pleasant, tranquil influence of the region of Patience was promptly realized. The electrodes were then applied upon the deltoid muscle (the region of Energy), and its rousing effect was quickly felt and expressed, — the effect being more marked than in any previously tried.

Applied next upon the mammæ, the delightful and bright influence of Love was not only realized but was fully expressed in his countenance and manner. Next applied upon Love and Health (the mammæ and centre of scapula), the effect was similar but much more substantial, — the emotion being associated with strength of character. Applied upon the back near the lower margin of the ribs on each side, he described the effect as producing a substantial business character, free from any elevated emotions.

On the back of the pelvis near or upon the sacro-iliac symphisis, the effect was a very gloomy, unsocial, unfriendly disposition, unfitted for society. The entire experiments occupied not much over forty-five minutes.

July 23, 1890, I began a course of illustrative experiments with Dr. W., a gentleman moderately impressible, of a calm, unexcitable, taciturn temperament and sound judgment. The experiments were conducted to obtain a record of results that might confidently be expected by my readers in similar cases, but not such as arise in the higher degrees of impressibility, when the phenomena occur very promptly and the mental and physical phenomena are abundant. The experiments occupied each from three to ten minutes.

1. The negative pole of the galvano-magnetic (primary) current on the shoulders (Health), the positive on the mammæ (Love). The effect he pronounced "stimulating, refreshing, elevating."

2. The poles reversed. The resulting condition was calm and amiable, less stimulating,— comparatively negative.

3. The positive pole at hypochondria (Disease) and the negative on the shoulders (Health). The first impression was disturbing and unpleasant from local impression before the effect of the current was realized, but in one minute he felt that it was "beneficial and strengthening," the "shoulders strong," the "head clear and bright," with a "disposition to be active" and increase of perspiration,— feeling as he does "when at work."

4. Poles reversed. He feels "less active, less warm," but nothing unpleasant, no impairment of strength. The tendency of the experi-

ment is to diminish the energies and increase the nervous sensibility at first but ultimately produce great depression, which was not realized in him, as his firm, healthy temperament was not sufficiently affected through only one side of the body in so short a time. There are many in whom such an experiment would have produced very great prostration, as it would in him if I had applied a stronger current for a longer time.

5. Positive on upper part of sternum (intellectual region), negative on lower half of tibia (aquatic). In one minute it is felt as very "depressing; a general letting down, mentally and physically." "Could not be very active." "Temperature not cold." (The lack of cooling was due to a moderate current affecting only one side of the body. When the Faradic current was used on both sides on the tibia, the cooling was distinct.) After seven minutes he felt mentally dull; disposed to be quiet and drowsy. Strength not affected.

6. Poles reversed. In one minute a very perceptible difference. "This is more agreeable." In three minutes feels clearer and brighter all over. "General improvement of feelings." "An elevating influence."

7. Positive to tibia (aquatic), negative on shoulders (Health). "This is an improvement on the last." "An elevating influence." "Feel it mostly in the muscular system."

8. Positive to middle of sternum (intellectual), negative on back behind arm just above its middle (Repose). "This is agreeable,—nothing depressing; a quiet condition, nothing active; very agreeable,—could rest with pleasure; would enjoy repose, quiet or rest; intellect dull." After five minutes the negative was moved anteriorly a little (upon Coolness). After two minutes feels much the same but a little cooler.

9. Negative moved two inches lower, nearly as low as elbow (Region of Force). In two minutes, "not so dull or drowsy; feels a bracing, active influence, like a tonic." I inform him of the value of combining Coolness and Force in treating fevers.

10. Positive on Coolness, negative on hypogastric region (Calorification). This quickly produces a feeling of heat all over the body, with increase of perspiration.

11. After four minutes poles reversed for a minute. It is "more agreeable and cooling, a better feeling," generally.

12. Negative to lower end of sternum (Somnolent and Ideal), positive to antagonistic region on dorsal spine. Agreeable; stimulating and brightening to mind; pleasant; tends to quiet meditation; brightens spiritual, intuitive faculties; favors mediumship; inclined to close the eyes." After eight minutes drowsiness begins.

13. Faradic currents — poles on end of sternum (Somnolence) and back (Repose). In one minute a drowsy, sleepy condition. "Feels it more than the last." In three minutes increasing drowsiness.

14. Faradic poles on both tibia (aquatic). Feels a "cold, apathetic condition;" a "general feeling of coldness and dulness;" breathing slower.

15. Both Faradic poles on shoulders (Health). Feels it instantly; "bracing, refreshing, and every way invigorating."

16. Faradic poles on upper dorsal and middle lumbar region. Feels as good as before, but the effect is chiefly on the muscular system; strengthening; "the other was more agreeable mentally."

17. Faradic poles on Repose. A dull sleepy feeling: "I could go to sleep at once."

18. Faradic poles on tibia and Repose on right side. Feels "much like the last;" "cooling and sleepy, more cooling;" "this is best for a cool, sleepy condition."

19. Faradic poles on ribs, about four inches below mammæ. Intending to reach gastric region, it proved too high, being on the ribs. Effect unpleasantly exciting, being Region of Excitability. Poles removed below ribs. "Nothing disagreeable;" "stimulates abdominal organs agreeably."

20. Faradic poles on each side below umbilicus. "Feel it in bowels; promotes their action." A little lower, feels it in the urinary organs. One pole on lumbar region, one on Defecation, "makes a commotion in the bowels."

21. Faradic poles on margin of ribs laterally (Irritability). "Affects respiration; a stimulating condition; stimulus rather agreeable." After three minutes: "Exciting; begins to be irritating." (Asks to stop it as disagreeable. It would have been disagreeable at first in an irritable and impressible temperament.)

22. Faradic poles near base of neck (Patience), on summit of shoulder. "A good influence; first-rate; a great improvement mentally and physically; as agreeable as anything." This was in harmony with his predominant tendencies, and the result was immediate.

23. Faradic poles to mammæ (Love). "Very good; first-rate; a good pleasant condition, elevating, bracing to physical and mental, would make one social, happy, lively."

24. Faradic poles to mammæ and shoulder (Love and Health). "Equally good, but more bracing physically."

25. Faradic poles to region under jaw (Insanity), a region very small and inactive in Mr. W. Effect "rousing, exciting, restless, depressing to mind."

26. Faradic poles below axilla (Sanity). Feels "a great deal better; it brings to the mind a fine feeling."

27. (Second day). Faradic poles to exterior quarter of calf (Aerial). "A good deal of force, but does not affect the mind; all physical; feels like travelling; stimulates muscles of legs; one could climb a mountain or a tree; could not study or stay in house; would seek the open fields."

28. Lateral surface of the knee. "More restless, but not much force; quite unpleasant." On the patella and on one side of it. "A restless, uneasy, mischievous feeling." On the tendons at the back of the knee. "An ugly condition," fit for violence and lawlessness,—"ready to fight, lawless, reckless."

29. On the trochanters, summit of femur. "Feel it in the limbs; stimulating; stimulates to action; a feeling of boldness; fit for battle."

30. Posterior summit of thigh. "Gives force, more than the last; more strength; less impulsive; fit for any undertaking of great power." (This makes a powerful combination with the summit of the dorsal spine.)

31. Middle posterior of thigh. "Muscular force, but rather lawless; tends to rowdyism."

32. Middle of inside of thigh. "Acts on muscular system; more for frolic than for work; tends to dissipation; intemperance; would seek low company; would make a good tramp; lascivious; don't care for dress or decency."

33. Middle of hips. "An active muscular condition; mentally exciting; couldn't study well; want to be on the move; would like to talk; somewhat fidgety and excitable; not really disagreeable."

34. Between ribs and hips (Baseness). "Rather unpleasant; would like to be let alone and get away from everybody; not in good condition for anything." [How would you make a living?] "Think I would steal; not energy enough to fight a man."

34½. Just back of Baseness. "Not much energy, but better than the last; too lazy to work; would prefer robbery or burglary."

35. Further back, on each side of spine. "Better energy; would assist to be a pugilist, but not of a low order; gives courage." On spine, same level, substantially the same. A little lower makes it a little stronger.

36. On deltoid muscles. "Very good influence; ready to take hold of anything useful; rousing, elevating."

37. On sacro-iliac symphisis. (Junction of sacrum and ilium.) "Rather disagreeable, both physically and mentally; rather lawless; disgusting; disgusted with everything; would find fault; peevish;

particular about food, not particular about dress; disgusted with everything; tends to nausea; couldn't stand a sea voyage."

38. Middle of buttocks, posterior aspect (Hatred). "Much like the last, but not so nauseating; more force; would not be agreeable; prefer retirement; don't care for company; would be quick to resent and revengeful."

39. One pole as the last and one on mammæ. "A much more elevating influence; makes things brighter, better, more agreeable."

40. On back above 38 and behind middle of hips. "Disagreeable; ready to fight anybody, and kill, too; fight with any weapons."

41. Summit of arms, posterior aspect (Self-respect). "A cheerful, agreeable feeling; qualifies for action in something useful; would like to lead."

42. On back just behind locations of Repose. "Social; agreeable."

43. At same level on spine. "Active in society or business."

44. Two inches lower on spine. "Practical energy for a mechanic, to take hold and do work."

45. Back of the elbows. "Very disagreeable; ugly; quarrelsome."

46. Acromion process. "Something like self-esteem (41); agreeable, hardy, fearless, active, fit for any undertaking."

47. Middle of humerus, posterior aspect. "Would help to carry on anything; bold and self-reliant."

48. Near upper dorsal vertebræ, on each side. "Great energy; hardens the muscles and fortifies the whole person for any undertaking, making fearless and heroic; much the same as the acromion process."

49. Poles on Health, for his benefit, to restore from the fatigue of experiment. Effects delightful and restorative.

50. (July 26.) Poles on chest exterior to mammæ; circulation and respiration stimulated. The poles transferred to upper dorsal (Oratory). Breathing better; influence more agreeable.

51. Poles on inside forearms, two inches below elbow. "A very pleasant, agreeable influence, elevating to sentiments; makes a social condition; bracing to whole system; good influence on digestive system." On the wrist and in the hand. "Similar but not so strong; suitable for social or business life."

52. Anterior to elbow on tendons of flexor muscles. "Bracing, good, elevating; assists a speaker or person of social influence."

53. Outside of middle of humerus. "A good influence, more business-like than social; rather showy; attentive to dress; would like to be conspicuous."

54. Prominence of front of shoulder. Feels "decided, firm, not very active; firm, solid, favorable to application, good for a student."

55. Top of shoulders. "Similar to last; a firm, solid man; loves to work, would not be idle."

56. Below Adhesiveness. (Aggressive.) "Bracing, invigorating, energetic; might act too quick sometimes."

57. Each side of umbilicus. "Deepens respiration and affects bowels." Just below umbilicus. "Affects the breathing much more; produces deep breathing."

58. On groin and thigh. "Rather bold and fearless." On groin alone. "Stimulates sexual vigor."

59. On instep. "Quiet, dull, sleepy." On upper surface over instep. "Not so dull; agreeable; cooling."

November 5, 1889, I recorded the following experiments with Dr. J. P. C., a gentleman of clear intelligence and habits of investigation.

1st. The positive pole of a small Sampson battery (magneto-galvanic or primary current) was applied to the hypochondrium on the left side, and the negative to the middle of the shoulder-blades on the left. At first there was too much muscular disturbance, and the current was then moderated. He reports the negative electrode as quite warm and slightly painful. It was substituted by a broader electrode. Within four minutes he described the effect as being "stimulating, bracing, restorative, enlivening; a good appetizer; strengthening and quieting."

2d. The positive was applied on the sternum, about the level of the third rib, and the negative below the shoulder-blade, corresponding to the location of Adhesiveness and Repose. For two or three minutes no distinct effect appeared; the electrodes felt warm. Then the effect appeared rather pleasing, though not marked, and the breathing appeared deeper. It was continued fully eight minutes longer and felt rather quieting. "A satisfying sensation; disposed to sit and enjoy myself, at peace with all mankind; a friendly feeling; very little mentality; somewhat social; it diminishes mental activity; a healthy feeling; disposed to take life easy and enjoy it; a good moral influence; a friendly feeling."

3d. The negative was applied to the dorsal summit of the spine, and the positive below the left hypochondrium (Region of Relaxation), and continued about eight minutes. He found it "stimulating; makes me more active; would not sit down doing nothing; it stimulates energy and courage and gives a sense of increased power."

4th. The negative was then shifted to the deltoid muscle of the shoulder (Energy). It felt very warming; the whole arm was warmed down to the elbow, and this attracted his attention chiefly. It felt as if a warm flannel had been applied. The mental condition

he pronounced active, with "a more active condition of the nervous system." The feeling was "similar to the last, but slightly different, having less activity or activity only in one line; more favorable to application, steady industry and concentration." This was continued about fifteen minutes, to procure a distinction from the previous very similar experiment, which roused the region of maximum force.

5th. The positive was placed in front of the ilium (Melancholy), and the negative in the axilla, against the ribs, covering Tranquillity and Cheerfulness. The positive was not felt, but the negative disturbed the muscles actively until the current was moderated. He said: "I feel like letting the world wag; a sort of relaxing feeling compared to the last; I feel like taking things easy; soothing, quieting; a state of passive enjoyment; peaceful, with enjoyment of life; cheerful, contented, satisfied with almost any condition of life." Time about twenty minutes.

6th. Previous condition reversed. Negative in hypogastric region (Melancholy). No change perceived for two minutes, then: "I don't like this so well — it makes a feeling of unquietness. I feel as though this don't amount to anything." (Laughs at the idea.) "I shouldn't enjoy life well; the feeling is depressing; it makes me low-spirited, but I am not easily depressed; don't often have the blues. It would make me distrustful and put a damper upon any business transaction, fearing it would not succeed; would not be contented in any kind of business."

7th. Both poles applied on the middle of shoulders (Health), with Faradic current. "It arouses the energies, clears the mentality, stimulates the business energies. This is the best of all. It stimulates the whole system, makes it active, as though I would like to be doing something actively, pushing ahead."

8th. After ten minutes the positive current was received through the north pole of a magnet, when he said: "The whole action is toned down, softer, milder, more permeating and agreeable; the local sensation is not like sharp pins, but gentler; the general effect more comfortable, not so disturbing, but with greater power; a better, stronger force; more agreeable. I could bear this three times longer than the other; that would in time become irritating, this would not; it is decidedly better."

Experiments with electricity, Nov. 29, 1887.— Dr. A. H. F.; very sensitive.

1. Positive on Calorification; negative on Coolness. Recognizes the effect as cooling; felt a momentary perspiration, which promptly ceased; hands feel very cold.

2. Positive on Coolness ; negative on Calorification. In one minute feels increase of heat ; in two minutes, perspiration all over body.

3. (8. 10 P. M.) Positive to Calorification ; negative electrodes on tibial regions. (8. 11.) Feels cooler, but not as decidedly as when on Coolness. (8. 15.) Same result distinctly, but less refrigerative than Coolness.

4. (8. 16.) Negative to Cooiness ; positive to Calorification. Cools more rapidly than last experiment and is soothing. (8. 18.) Pleasant, cooling effect and no perspiration.

5. (8. 20.) Positive on middle of sternum ; negative to region of Repose. (8. 22.) Sedative to mental faculties ; begins to feel drowsy. (8.24.) Would go to sleep if in bed. (8.25.) Feels dull and sleepy.

6. (8.28.) Positive above, on Coolness ; negative two inches below umbilicus. (8.30.) Heating ; lively feeling ; breathes very easily ; respiration deeper ; feel that I need more breath ; a cheerful influence ; could laugh easily.

7. (8.35.) Negative on thighs, one-third above the knee ; positive on the region of Tranquillity. Proves too exciting, and the operator applies his hand to conduct the current to Tranquillity. The current was slight, and the influence of the hand predominating changed the effect, which at first was exciting, and it became very quieting. Seeing this, I had the electrode replaced instead of the hand in contact, at 8.43. At 8.44 he felt very restless, as if he wanted to move around, from a stimulating influence. (8.45.) Reversed : positive electrode on left thigh ; negative electrodes on Tranquillity. In two minutes a very different feeling ; very quieting. It would be agreeable to go to sleep under such an influence.

8. (8.50.) Positive on Coolness and Sleep ; negative between mammæ and lower part of sternum. In a few minutes feels a drowsy, trance-like condition, as if becoming unconscious. Drops the electrodes, applies them again, and soon removes them, saying he feared he should tumble down. This produces the mesmeric condition.

9. The Faradic poles applied to the front of each thigh roused him and removed all the last influences.

10. Faradic poles on Health. Restorative ; very pleasant and invigorating. Laughs.

11. Faradic poles covered with Hydrangea extract. Applied one to kidneys and one to Health, at his request, as he had been affected in kidneys ; produced a very fine restorative effect.

With H. M., a man of narrow head and unimpressible temperament, I tried several experiments with twelve zinc carbon cells, holding the positive in his left hand. The most distinct effect that he experienced was the warming effect when the negative pole was

applied on Calorification below the umbilicus. At the epigastric region of Somnolence he felt the drowsy effect, which ceased when the electrode was moved higher or lower.

On the thorax, behind and below the left nipple, he felt the exciting effect; and a very soothing, quieting influence when the electrode was applied at the organ of Patience on the summit of the head, which was well developed. He also felt a moderate exciting or restless influence on the posterior quarter of the neck, and a very quieting influence at the organ of Tranquillity (parietal arch). On the brow, at the root of the nose, he felt a mental excitement and flashing in the eyes. On the opposite occipital region he recognized a dull influence. On the amiable region of the top head he felt a quiet influence, but on the combative region, which was small, he recognized nothing. It was quite apparent that he recognized influences in proportion to the development of the organs. The visceral region of the brain was small, and hence, though he recognized other influences in less than a minute, a ten minutes' current to the abdomen over the colon produced no internal effect that he could recognize. I tried the same upon myself and felt only the deeper respiration which belongs to the hypogastric region.

I found the most responsive point in his system was the phrenic locality on the side, which stimulated the diaphragm vigorously. He felt not much influence at the hypogastric location of Respiration, but felt Calorification very readily.

Upon Mr. K., the very vigorous, robust sensitive, I tested all the points connected with respiration. A current from side to side at the phrenic locality, on the lower ribs, affected him powerfully.

A current from the hand to hypogastric Respiration produced an increase of deep breathing, but not equal to the currents through the side.

The current from the phrenic location on the back, about the 7th dorsal vertebra, to hypogastric Respiration produced stronger respiration, but not of so impulsive and involuntary a character as when applied on the side. It seemed to be of a more healthy and vigorous character.

The current from the phrenic nerve downwards to hypogastric Respiration was the feeblest of all, nor was it near as vigorous when sent to the side as the horizontal currents. Evidently the lateral current would be the most powerful in rousing him from asphyxia. A similar influence was produced by applying the fingers on the head just over the cavity of the ear. In others in whom Irritability was less developed, however, I have found the current from the back of the neck to the hypogastric seat of Respiration most effective.

To reach the heart I applied the poles on each side about four inches obliquely downward and backward from the nipple. The response was prompt; it was both exciting and invigorating to the heart. This point had been felt quite distinctly also by H. M. Next applying the electrodes on each side, at and above the nipples and a little nearer the median line, the heart was excited also, but with a weak, fluttering feeling, which belongs to the emotions connected with that part of the chest. Love is always supposed to affect the heart. It is true in Sarcognomy, but it is a softening and enfeebling action. It is courage and the violent passions which give it strength.

I made several experiments in applying the two electrodes near together on the body and on the head, with the galvanic and with the primary helix current, and the effects were similar to what I had been accustomed to produce by the hand. When I held the negative pole in my hand (he holding the positive), and applied my hands to his head or body, he recognized the effect as being greater than when I used the hand without electricity.

As the hand resembles the negative pole in its effects and the negative pole reinforces the hand, the question arises how the positive pole would influence the power of the hand. Reason would indicate that the hand would modify the positive influence, making it more general and less dispersive, — a beneficial stimulus, — which is the fact.

My own electric impressibility is of quite a low grade, but in my personal experience of the hygienic current I have realized its character. I had been suffering from a disturbance of the liver, producing fever and oppression of the brain, which made literary labor irksome. I tried this current for twenty or thirty minutes, and realized greater freedom of respiration and greater activity of brain, especially of the upper region of the brain, producing a normal development of character and a general feeling of pleasure and comfort. The liver was not so much improved, for it was an old offender, but it troubled me much less and it had a healthier feeling next morning, while the happy normal condition of the general constitution remained, giving me a personal experience of the ethical power of the hygienic current.

A partially insane patient to whom I applied the current passed a more quiet night than usual. I also gave her the cephalic current until it produced a strong impression upon the upper posterior part of the head.

Having had an attack of irritation of the liver I ventured, as an experiment, to send a galvanic current from six cells through the liver from front to the spine (the posterior pole a little higher than the

anterior). Under this influence, just before retiring, I found my temperature elevated and almost feverish, and a wakeful state of excitability established which made it necessary for me to rise very early to counteract it, which I did by currents to the region of Health and to the regions of Coolness and Sleep. This removed the fever and I slept very soundly until roused by the breakfast bell with an unfinished nap. During the whole forenoon I felt that it would be very easy and agreeable to renew my sleep.

To test the electric transmission of medical influences, I constructed a medical rheophore by inserting through a cork a stout wire in a tube of galvanized iron closed at the ends and filled with a solution of aloes. Through this I passed a current of six to twelve cells from one hand to the other of a sensitive and intelligent lady who was of constipated habit. She recognized the peculiar influence of aloes, not knowing the contents of the rheophore, and said that it would prove cathartic if continued. I tried the same with another patient equally sensitive and somewhat constipated, for a few minutes in the afternoon, until she recognized an influence on the bowels and a bitterness in the throat and nostrils. Next day she complained that she had felt the disturbing influence all the evening. I tried the experiment with her again (substituting hydrastis for aloes), less than five minutes. She felt a strong tonic influence as she expressed it, as if she was being charged with power, which might be beneficial if she did not get an overdose, — taking her hands off alternately to moderate the tension.

Using the same rheophore, on another occasion, I placed it in the hands of a gentleman whose psychometric capacity was sufficient to judge of anything held in his hands. In less than two minutes he recognized its tendency to act on the bowels. Then connecting it with a positive electrode from six cells, while he held the negative in his other hand, he recognized the influence much more promptly and completely, giving a good description of the action of aloes and saying that he felt the influence three times as forcibly as before the application of the current.

ILLUSTRATIVE EXPERIMENTS.

It is over forty-two years since I made the experiments which developed the principles of Sarcognomy. I kept no record of their details. My publications simply presented the results, and my lectures presented the verification in the experiments before auditors.

It would have been interesting, no doubt, to many, if I had recorded all the steps of the investigation, — the experiments, the reasoning, the difficulties and the triumphs of the research in the first develop-

ment of the Science of Sarcognomy, the revelation of mysteries, the illumination of medical philosophy. But I thought only of the grand results, and knew that whatever I discovered others would in time verify. Hence I attached no importance to my individual labors and the incidents of the investigation.

There are many who treasure up and never forget the incidents of their personal experience and achievements, who are inexhaustible in the narration of what *they* have done or witnessed, but I have no such ability or inclination; I would gather and carry with me the harvest of great truths which are to make the world wiser and better, but I leave behind all irrelevant and personal matter. Content to retain principles, I seldom revert to the experiments and incidents of their development; and I have preserved no record of my early experiments even in memory. Nor was there any temptation or opportunity, at the time, to publish the incidents while they still had to me the interest of a marvellous novelty, which they have long lost.

All that I did was in an intellectual solitude. There was no channel in current literature in which I might have floated the product of my labors. A cold inhospitality repels the new and the marvellous. As stranger is synonymous with enemy among barbarian races; so it is, in the present half-civilized age, a strangely new thought or discovery meets everywhere with indifference or aversion, and I soon learned to desist from any attempt to familiarize the readers of periodicals with that new world of science and philosophy in which I had entered, — for even when the prejudice of an editor has been overcome, the prejudice of his readers is equally formidable.

Believing, however, that the present time affords a small audience for the honest and successful explorer of mysteries, who may listen to his narrative with interest, I shall introduce in this volume a statement of experiments which may give the reader a more vivid idea of the elementary facts of Sarcognomy and partially compensate for my failure originally to record such illustrations.

To produce a good experimental illustration of anything we need the best materials. For experiments on the human constitution we require the highest sensibility, impressibility, and intuitive quickness of conception, by means of which we promptly attain results which would be unattainable under ordinary circumstances.

The entire development of Anthropology was successful, because I availed myself of such methods, which others had neglected.

The electrical experiments which I shall here record were made on one of the highest degree of sensitive impressibility and confirmed

by repetition on others. They were not the experiments of discovery, which were made without electricity, but were the illustration by the electric agency of what I had already established by the nervauric process, and therefore were more concise and clear than if they had been an attempt at discovery with no previous understanding of the subject. I had but to verify with galvanic plates and Faradic currents what the hand had already established.

Wishing to demonstrate the effect of galvanic plates, I connected a plate of iron a little over two inches square with a silver coin about one inch in diameter by insulated copper wire, and selected for experiment Mr. K., a very sensitive yet very vigorous gentleman in the prime of life, from whose quick impressibility I could get better results in five minutes than others could yield in twenty, and from appliances that few could feel distinctly.

I applied the iron plate to the forehead and the silver to the back of the neck. In less than a minute he began to feel dull and drowsy from the dispersing influence of the positive pole upon the intellectual faculties.

Reversing the plates, he immediately felt wakeful and bright.

Applying the iron on the adhesive unintellectual region and the silver at the root of the nose, he felt disposed to close his eyes and exercise the interior vision. "It comes nearer putting me to sleep than anything ever did before," was his remark.

Applying the plates on each temple, an inch behind the brow, he said the effect was similar but greater, — an inclination to go into trance. I perceived that his mental condition was very bright.

Applying the iron plate at the back of the neck and the silver at the chin, he felt a heating and exciting influence, saying, "I would soon be in a perspiration."

Applying the iron on the spine near the kidneys and the silver about three or four inches below the umbilicus (Calorification), he felt a general stimulation and heat, similar to the effects at the chin.

Reversing the plates, the effects were somewhat confused, as the iron plate had left some irritation; but placing the silver on the side behind the middle of the arm, he soon felt a soothing and cooling influence.

The iron at the lumbo-sacral region and silver at the perineum produced a decided erotic influence.

The iron at the angle of the lower jaw and silver just above the parietal arch over the ear vertically — the surface being wet — (Region of Tranquillity and Cheerfulness), he felt disposed to study, and in a calm, cheerful state of mind.

The iron plate, however, being disproportionally large, the peculiar

irritative effect of the metal was felt at each location, and slightly disturbed the course of the experiment; and when I applied it to the region of Disease on the cheek this effect was so strong that I discontinued the experiments to procure a better apparatus.

(Ap. 21.) I had prepared a silver plate four and three-fourths by three inches connected to a zinc (galvanized iron) plate three by two and a half, faced with a piece of cloth saturated with brine.

Health and Disease. — The clothing being removed, I placed the zinc plate in the hypochondriac region (marked Disease on the map) and the silver on the shoulder (region marked Health). He said: "This stirs up the liver,—if the liver was torpid this would start it and make the bowels carry off the effect. The influence is very pleasant, —it would drive away the blues and make one look on the cheerful side of things. It is invigorating. If I were dull and moping, this would stir me up to go to work. It is invigorating, cheering and pleasant."

After three or four minutes, I reversed the position of the plates. He began in less than a minute to express the effect: "I don't like this. It would put me in the dumps, — to feel like suicide. It's decidedly oppressive; makes me feel a swelling and fulness in the region of the liver and stomach. I feel tight across the bowels. I feel as if I was poisoned. I feel as a poisoned puppy looks."

The plates were then restored to the first position, the silver plate on Health, which elicited the remark: "This takes all the bad feeling away. I am growing more cheerful, bright and hopeful. I could bear trouble better under this influence. Under the other, everything would trouble me."

Such is an example of the prompt and thorough effect which may be realized with the most impressible, — the class that yield readily to the nervaura of the hand. Others require a longer time and stronger current, but the best demonstration for the evolution of science is where we have the best material for experiment. Electric science has been much indebted to the delicacy of the frog galvanoscope, though its function has been limited to the discovery of delicate currents. The human galvanoscope is vastly superior in importance, because it can reveal the laws of physiology and psychology.

This foregoing experiment teaches us that the current to the hypochondrium is injurious, dangerous and capable of doing a vast deal of mischief. Dr. Beard avoided this mischief by currents to the epigastrium, which may be beneficial if cautiously administered, but which are liable to eliciting the morbid hypochondriac influence if continued or applied with vigor. Dr. Althaus found it necessary to discontinue currents to the epigastric region on account of their

injurious effects. It is presumable that he used a stronger or more prolonged current, and did not carefully avoid the hypochondria. The mesmerizers formerly did a great deal of mischief in producing the somniloquent and clairvoyant state, by prolonging their passes down the thorax as far as the margin of the ribs, the patients being sometimes sickened, nauseated or thrown into convulsions. Beard and Rockwell say: "A medical friend, who by our suggestion treated a case of ulcer of the stomach by the galvanic current, informed us that a very mild current from a few zinc carbon cells, which gave no sensation on the surface whatever, would, after the electrodes had been kept in position a few minutes, one on the epigastric and the other on the back, cause, all of a sudden and without any warning, a painful shock, as though a strong current had been suddenly interrupted in the metallic part of the circuit. This phenomenon occurred so often that he abandoned the treatment."

It is remarkable that electricians have gathered so little knowledge of the effects of electric currents near the middle of the trunk. Passing backward they are apt to accumulate a morbid irritability, as in the above case, and passing forward they are liable to produce morbid and exhausting effects.

The demonstration of the morbific and healthful regions of the body is not an isolated matter, but supplements my discovery of the same in the head, which constitutes a part of the systematic and philosophic science of Anthropology, which is also amply verified in the history of diseases.

It teaches us the controlling principle of true electro-therapeutics, that currents should be as far as possible upward and backward, and only to a limited extent downward and forward,—a principle which blind empiricism failed to discover.

Moreover, it teaches us that the best position for the negative pole is on the superior posterior surfaces, and the best position for the positive is on the anterior inferior. The abdominal surface generally is a good location for the positive, but *the specially appropriate location for introducing the current is at the hypochondria.* This is what electricians have entirely failed to discover. A current from the hypochondria to the shoulders, the thighs or any part of the spinal column is highly invigorating. To the region of Coolness it is highly beneficial in fever — to the anterior or tibial surface of the leg it is eminently beneficial in pneumonia — to the summit of the dorsal portion of the spine it invigorates the brain — to the middle dorsal region it invigorates the lungs and heart — to the lower dorsal region all the abdominal viscera: and in doing this it sustains the tone of the nervous system, overcoming all morbid irritability and depression of body or mind.

2d Experiment. — Abdominal region. The zinc was placed on the top of the shoulder, in the region of Energy, which is antagonistic to the abdominal region, and the silver on the hypogastric region of Evacuation (Defecation). His expression was as follows:

"I feel it in the lower bowels. It causes a trouble, a fulness, as if the bowels were out of order. I feel as if it would be difficult to retain the urine. It causes a tight, oppressed feeling of congestion in the bowels. It might cause an inflammation there."

As this was evidently an unhealthy, prostrating influence, I changed the experiment by removing the zinc to the gastric region towards the side at the margin of the ribs, a region that affects the stomach and to some extent the liver and spleen. "That's better and more endurable," was his first remark; "a decided improvement. This would relieve constipation. With a stronger current it would open the bowels. I feel a pain in the region of the zinc; it is going down the bowels, something like a drastic cathartic. It feels something like cathartic pills, — just after taking them." The plates were then removed. The effect was obviously that of a current through the alimentary canal similar to Aldini's experiment of a current from the tongue to the anus, with two plates such as I used.

The analogy of this experiment to a cathartic pill was very exact. Pills which simply rouse and irritate the alimentary canal are not very wholesome in their effects, and many physicians have been strongly opposed to them, although there is ample evidence of the utility of cathartics. Certainly the abdominal region, if much excited or irritated, has a depressing and debilitating effect. But a proper energy in the abdominal functions, associated with the sustaining and regulating influence of the higher functions, or, in other words, of Health, must be beneficial. Hence aperient medicines which have a tonic and nervine character are quite wholesome and altogether to be commended, of which we have a fine example in the Chelone Glabra (Balmony) and the Berberis (Barberry).

In electric practice this happy combination may be attained by passing the current from the hypochondria to the successive parts of the gastro-intestinal tract, or by passing the Faradic current between the centre of the shoulders and the gastro-intestinal tract, so as to bring the two into co-operation. A similar result may be produced in medical practice by associating cathartic remedies with Hyoscyamus, Belladonna, Hydrastis and Quassia, which prevent them from being either irritating, depressing or debilitating.

As a general rule, the abdomen should be associated with the spinal column, especially the lower dorsal region, in electric treatment.

3d Experiment. — The average time occupied in the preceding applications did not exceed ten minutes each. At 4.21 I applied the silver to the region of Calorification and the zinc to the region of Coldness. In its first application it extended an inch too far back, and his first remark was: "This produces a sleepy feeling." As this indicated an action on the region of Repose, I moved the zinc a little forward. His first remark was: "I'd like this in fever. It would have a fine effect in typhoid fever. I think it would break it up. If there was tightness and congestion in the bowels this would relieve it, cool the fever and promote sleep; I did not think it would. It don't act as it did before, to make a congestion under the silver." (In 2d experiment.)

4.29 — "The effect begins to change. I don't like it now. It's getting painful. The bowels begin to feel tight. The temperature is rising. The condition is altogether different. I believe this would produce fever. I am getting warm; I feel it all over, as if the veins were swelling and the blood getting hot." 4.31 — "I feel as warm as if I had an overcoat on." (He was naked from the hips up.) 4.32 — "I begin to feel nausea. In a short time, in this way, I would go to bed sick." 4.33 — "I'm dizzy-headed; my head is beginning to ache; my head is heavy and tight. It is getting troublesome to look out; the light is too strong; I don't like that. If I had been feverish this would have made me sick. Look at my veins."

4.35 — Plates reversed: silver to Coldness; zinc to Calorification. "I feel it in throat and lungs. The irritation is leaving below; the feeling is passing up." 4.38 — "It's all gone except in my head." (Gapes and laughs.) "The dizziness is all gone." 4.40 — "Nearly all gone, but a little feeling remaining in the eyes." 4.40½ — "Guess I'm convalescent." (Gapes.) 4.43 — "As soon go to sleep an hour or two as not."

Question: What is your temperature? "It cooled down rapidly after the change, rather below the natural. I think now it's fully up to the natural, if not above. I feel very comfortable; the best feeling I have had. I'd advise those who want to sleep to try this. I never have any trouble in sleeping." 4.47 — "In the former application I was entirely upset. Now I'm quite natural, comfortable and rather indolent and good-natured; disposed to sleep. A healthy but not a lively feeling; a good, social feeling."

This was a very instructive experiment, — in the beginning and throughout, the cooling associated with the sleepy and social region; all being close together. The first effect of the positive current passing in at the cooling region was to stimulate it, electricity being

a normal stimulus. It required several minutes for the dispersive and sedative influence of the positive current (called anelectrotonus by electricians) to be established. In eight minutes the stimulating effect gave way to anelectrotonus, suppressing the cool, sedative influence of the lateral aspect of the thorax and establishing catelectrotonus in the calorific region, with its heat, oppression of the head, photophobia, fever and nausea, all of which were happily removed by reversing the plates, carrying the developing catelectrotonus of the negative pole to the cool, healthy, social region just behind the humerus, and dispersing the hypogastric excitement by the anelectro tonus of the zinc plate. From this we learn that fevers are to be combated by positive currents sent through the hypogastric region to the side of the thorax, and if any other sedative influence can produce the dispersive effects of the positive pole they should be applied in fever to the hypogastric region. This is true of the hot water douche, which is powerful in fever if applied to the hypogastric region.

We may also learn from this experiment that the negative pole at Calorification will counteract the coldness of a chill, but if the positive pole be applied on the postero-lateral side of the chest its exhaustive influence there, impairing tone and nutrition, would endanger running into fever. Hence, in counteracting a chill, the more appropriate treatment would be a Faradic current between the lumbo-sacral or lumbo-dorsal and hypogastric regions, which would be invigorating as well as warming.

4th Experiment. — The fourth experiment was instructive in both a psychic and a physiological sense. The silver was applied to the lumbo-sacral region of physical force and virility, the zinc to the region of Reverence on the side of the chest adjacent to the middle of the humerus, at 4.53. At 4.55 he says: "This acts on the whole system; affects the muscles and viscera. I could do a good, hard day's work. I feel like handling the hammer and the axe. It is highly stimulating to the muscles. A very fine influence; good for lazy people."

Question: What effect has it on the temper? "There is a 'don't-care' feeling; busy; don't want any one to bother or meddle; would be quiet if let alone, but quarrelsome if bothered. I perceive no sexual desire but there is sexual vigor. This is a fine tonic; it creates great force, driving force, animal force, no thought. It is just like Damiana."

This illustrates the muscular power of the lower part of the spine and its antagonism to the intellectual, inspirational character of the thorax. Damiana, to which he compared the influence excited in the

lumbo-sacral region, has been classed by physicians as an aphrodisiac, but the expression is incorrect. It is simply a muscle invigorator, acting vigorously on the lower part of the spine, and the sexual impotence which it has relieved was probably simply a muscular impotence removable by muscular tonics.

EXPERIMENTS RESUMED. — 3.45 — Zinc on the sternum (intellectual region); silver on side of the back at Sleep and Coolness.

3.47 — Seems slow to express himself. "I think it's sedative."

3.48 — "It's decidedly sedative. I could go to sleep; it's quieting. If one was restless, irritable and unable to sleep, this would quiet him."

3.49 — "It brings a thoughtful as well as sleepy feeling; one would sleep and yet the spirit be awake. It would be a healthy, restorative sleep, and one would wake much refreshed after pleasant dreams. The spiritual influence issues from the front. There are two distinct feelings."

In this case the zinc plate was not large enough to suppress intellectual action entirely.

3.54 — Plates reversed. "This is stimulating. I feel like using my arms. It stimulates the intellect. I don't feel sleepy at all,— I'm completely waked up, mentally and physically. The other made me disposed to go to sleep and dream. With this I prefer anything else,— activity and study. I could not sleep at all under this influence."

4. — Zinc on shoulder; silver above the umbilicus. "This causes pain and swelling; a feeling like cramp. It creates nausea. It would give me cramp in the stomach. It goes down in the bowels; it travels up and down; it would bring on cramp and vomiting."

In this we see the evil effect of downward and anterior currents from the shoulder,— a class especially to be avoided.

4.04 — Zinc changed to the lower dorsal region. "This brings a different effect. The unpleasant feeling is all gone. It feels now strengthening to the stomach; good for dyspepsia; tonic and stimulant to the stomach; very comfortable indeed."

4.05 — "It begins to be sleepy; like an after-dinner sleep,— an easy, good-natured sleep, very soothing to the stomach. It does not produce any hunger. It's a good influence to sleep with; good for cramp in the stomach."

The negative in this case was at the assimilative region, which has a soothing, semi-drowsy influence.

4.10 — Zinc and silver on right and left side of back, about the middle of the posterior part of the ilium; a region of hostile passions. "I'd get quarrelsome under this influence. I feel like saying 'I'll kick the devil out of you.' I'd fight my best friend. I feel it here, too,

in the hypogastric region ; it stimulates there ; it stimulates the pelvic organs ; stimulating, tonic and upbuilding to the pelvic region."

4.20 — Plates moved farther out and higher up ; zinc on the right side. " This affects the groin on the right side, as if there was a swelling. On the whole, rather good-natured, and inclined to laugh and be social and gallant." (This was the posterior portion of the region of Vivacity.)

4.25 — Plates a little lower. "Much like the last ; good-natured ; rather dull, but strengthening ; favors the sexual."

4.30 — Zinc to Chastity (on the ribs laterally) ; silver to sacrum. "This gives erotic desires ; excitement and physical ability."

4.39 — Reversed : silver to Chastity and Dignity ; zinc to sacrum. "This is a nice influence ; healthy and strong, as if I could face the world. It's quieting, yet with strength. The passion and desire are taken away. It gives a healthy condition to the genitals, quelling all excitement. This would subdue any excitement in the genital organs and would be beneficial if inflammation or irritation existed."

4.45 — Moved silver to Reverence. "This is more subduing ; a gentle, lovable influence, very quiet ; would make me very good-natured and affectionate, but deferential. I'd fall in love easily. It would reduce the sexual power to nothing, like castration. I know some that ought to wear this."

The influence of Reverence is antagonistic to the lumbo-sacral region, which supports virility. The influence of Chastity antagonizes the sexual organs.

Wednesday.— 2.39 — EXPERIMENTS ON THE HEAD. Zinc to Disease on the left side ; silver to Health on right side. " This gives a strange feeling in the throat ; nauseating ; this passes off ; now very agreeable." (The first effect was the local irritative effect of the zinc, the second the effect of the established current.)

3 — " This is a very nice condition ; it feels strengthening, enlivening. Good, healthy, tonic."

3.02 — Silver changed to region of Vital Force behind mastoid process.

3.03 — " Rather sickening to stomach. It's annoying. Gives an irritating, impatient feeling ; makes me feel ugly. I feel like fighting ; impatient and quarrelsome with anybody ; a nasty feeling."

3.07 — Silver to Religion ; zinc to Vitality and Muscularity. " That's nice. It clears all the trouble away ; makes the head clear and bright ; stimulates thought and helps one to carry it out."

The religious region has a brightening influence on the intellect, especially on the intuitive portion, and an invigorating influence on the character, when not carried to excess.

3.10 — Zinc to Firmness; silver to Somnolence and Meditation. "This will quiet a person. I would forget all trouble and care and be perfectly quiet and passive. I feel that my eyes are going to shut, and I could look away off,— not seeing,— but with a quiet, dreamy feeling. I would look into spiritual science deeply, and into the occult; wouldn't think of anything but spiritual science."

Experiments on the Body.

3.48 — Zinc to the perineum; silver to region of Sanity below the armpit. "Very quieting to the pelvic organs; quieting to the mind. Good for excitement or hysteria or anything exciting; would take down sexual excitement. Very cooling, soothing and quieting to the head; good for insanity. If one was in a towering rage this would control it."

3.52 — Silver changed to Health (centre of shoulder-blade). "Not so soothing, but healthy and strong. It gives vigor and determination; strengthens genitals. A splendid tonic for one broken down; increases the strength of the whole system."

3.55 — Zinc to epigastrium; silver to shoulder. "Good for inflammation of stomach. If anything was wrong it would scatter pain or cramp or take down inflammation. The effect is similar to opium. Morphine would be stronger and more deadening; would soothe pain quicker, but deaden. This gives life and strength; has a tonic, life-giving effect, while morphine deadens and does no good. The influence is more soothing, outward, at the top of the shoulder; stronger near spine." (The silver was moved over the shoulder.)

4.03 — Zinc to Disease (hypochondria); silver to aquatic region (front of the leg). "I'd like to go in swimming. Haven't had such a desire for a long time. I breathe very easily; I could go to sleep. This is good for asthma or for pneumonia. There is a very strong feeling for the water; a desire to swim. I think it is cooling. It's cooling to the chest. It would reduce a fever; it has a very sleepy feeling."

4.20 — Faradic current from a very small battery to Health and Inspiration. "This is healthy, tonic and strengthening to the lungs; good in consumption; but the aquatic influence relieves congestion more quickly." In this we perceive that the Faradic current develops at both poles. This explains the marvellous success of Dr. Bastings and others in consumption by thoracic currents.

4.26 — Zinc to Nutrition; silver to Hope and Mortality, above mammæ and near the arm (a spiritual region antagonistic to Vital Force). "I like this very much; it is strengthening, cheering, elevating, quieting; would be strong and refined. This would reduce cor-

pulence. Too much would take down the flesh ; would make one really lean, if persisted in. But I like it ; if sickly, it would build one up."

In this experiment the first sensation was that which belongs to the pleasant and strong excitement of the higher emotions. The second expression shows the repressive effect of the positive pole on Nutrition, the only effective method of controlling obesity without injurious modification of diet and habits.

4.30 — Silver changed to upper end of sternum. (This is an intellectual location and would tend to reduce the vital forces.) "I wouldn't grow fat under this, but the other is most opposed to corpulence. This would develop spirituality and intellectuality ; but is rather debilitating, like study."

4.37 — Zinc to Melancholy on the abdomen ; silver in the axilla. "This is an agreeable feeling." (He seemed very meditative and disposed to be silent.) "I don't feel like speaking ; feel quiet ; would like to sit down and sit still. It would make me think all my friends were dead."

In this case the experiment miscarried. The silver was placed too low on the side, so as to cover the regions of Tranquillity, Concentration and Cautiousness, — the region which develops the patient student, — and thus detracted from the influence of the neighboring region of Cheerfulness, which could not easily be reached by a flat plate. I therefore removed the plates, and restored his cheerfulness by placing the fingers on the organ, pressing upward in the axilla, which restored his cheerful feelings. "Now I would put aside all troubles," was his concluding remark.

May 3. Plates used 6 by 4 inches.

1st. Broad plates being used, the zinc plate covered the epigastric and hypochondriac regions, coming up to about two inches below mammæ ; the silver was applied on the left shoulder. "This makes an unpleasant feeling ; almost a cramp ; a drawing-up at the stomach."

This indicated that the silver plate was inactive and the only influence was the metallic effect of the zinc ; therefore I wet the shoulder under the silver plate and the natural result promptly appeared (3.10). "That's pleasant. This would be very wholesome and soothing to the stomach ; it removes the cramp. It is strengthening, and I'm getting sleepy, too." This was because the limited space touched on the shoulder was not adequate to counteract the soothing or drowsy influence of the epigastric region, which was stimulated by the first contact before the current was effective. As there is a more vigilant influence at the upper part of the dorsal region I placed the silver there, but found it still ineffective. He said : "I feel very lazy. I would hardly roll out of the way of a horse-car." This showed that the region of Indolence or Relaxation covered by the lower part of the

plate was taking predominance, and therefore I removed the silver plate to the region of Energy (the middle of the superior aspect of the shoulder). He said: "Now I'm waking up. That's refreshing, strengthening; gives a great deal of strength. It's bright and cheerful."

2d. Zinc on mammæ; silver on back of hand: producing a current from Love to Hostility. "This makes me feel like striking out to throw it off. The arm feels swelled, as if the muscles were growing. It's an ugly, quarrelsome feeling. I'd be inclined to strike out. I'd like to strike something; I want to hit something. It's a peculiar feeling; not so ugly, but a love of hitting. Boxing would satisfy it. I'd repel everybody. It throws great life and force into the arms. I want to box, but it's not really a devilish feeling. I would work off the extra force. My arms feel as they did when I was sparring."

3d. Plates reversed: silver to the mammæ; zinc to back of hand. He laughs heartily. "That knocks all the fight out of me; I feel as if I'd turn and run away from a fight. I never felt anything so strong."

4th. Zinc along lower part of sternum; silver to back, a little above and exterior to lower angle of scapula (region of Playfulness and Dignity or Self-sufficiency). "I'd take things quietly, but it's a saucy, independent feeling. I feel as good a man as anybody; not quarrelsome, but saucy; quite capable of taking care of myself." Moving silver down to the region of Playfulness (top of the scapula). "That's nice; much the same, but more congenial. If I saw anything funny I could laugh at it. I'd like to joke under this influence. I wouldn't argue; I'd poke fun at them."

5th. Current from hostile to friendly region, left side of body. Sits on zinc; silver above mammæ. "There's a feeling of disgust. I don't like it." As this indicated that the current was not flowing, I wet the space under the silver to establish the current. "There's an affectionate feeling, as if I would put my arm around somebody. It sustains the strength. [The moderate stimulation of the higher sentiments is always invigorating.] It's quieting. [How does it affect the stomach?] There's a sense of fulness. It would check the appetite. If there was hunger, I would forget the hunger. It is strengthening; quieting to the heart, tonic to the bowels; would overcome looseness and restore healthy action; would tend to check seasickness. It works that way. One of the best general influences I have felt. It would diminish respiration."

This illustrates the happy hygienic influence of the higher sentiments and their quieting influence on animal life.

Silver was removed from mammæ to Health on the shoulder. "This gives me more vigor, health and activity; the other was too yielding

and spiritual. This is all activity and strength ; better, too, for lungs and head."

6th. Current from Love to Hatred and Disgust : zinc above mammæ ; silver on upper part of ilium and sacrum. "I feel a pain across the small of the back, lumbar and sacral region. I'd like to sit still. I wouldn't go into company ; I'd be all alone, discouraged, disheartened, suspicious of humanity generally. I wouldn't love my neighbor. It would make me morbidly solitary. I wouldn't care about eating. I don't care about food. It destroys the appetite. I'd rather go off and think I was abused. It's weakening. A man's hair would turn gray early under this. I'd go out and lie down. It destroys all activity ; makes the world a house of mourning. It would drive one insane by gloom. This would be awful in seasickness ; I'd want to die. If a boat should rock I'd be sick. Anything disgusting would cause nausea." To test this I told a little anecdote of sickness which brought in a disgusting circumstance, and he rose and rushed to the basin, nauseated, but did not actually vomit. "That's pretty rough," he said.

7th. Plates reversed. "This feels delightful. I'd rush into company to enjoy it. [How is the stomach ?] I'd relish almost any kind of dinner."

These experiments illustrate the influence of despair and disgust ; the region of Hope and Love being depressed by the upper plate, while disgust, aversion and gloom were developed by the lower. The reversal produced a delightful rush of affectionate and happy sentiment.

8th. Degrading influences. Zinc below and behind armpit (region of Sanity and Dignity) ; silver at and near coccyx, on the borders of Insanity and Hate and at the spinal origin of Animality. "I'd be restless, roaming around, finding fault with everybody and everything, doing nothing, dissatisfied. [Could you study ?] I'd rather go fishing ; I would'nt like study. It makes me careless ; I'd neglect everything ; my chief characteristic would be carelessness. [How much intelligence would you have ?] I wouldn't study or read ; I wouldn't have much intelligence. If anyone commenced talking above the most commonplace I'd be tired ; disgusted with anything above gossip. Horses and dogs would interest me ; I'd just be on their level. It's a light-hearted, careless, go-as-you-please feeling. It would impair the memory. That walking match would suit me. I'd enjoy merriment and company. It reminds me of the ignorant old English squires of the 14th and 15th centuries ; jolly sportsmen. I'd be very fond of the women. There's no intellectuality in this, but the reverse."

9th. Zinc as before; silver lower, extending below coccyx and above. "That would make me a libertine. It takes away all the good of

the other; makes the man more of a brute. This is selfish, brutal; does mean, underhanded things; watches opportunity to take advantage; decidedly selfish. It takes away all the sunshine of the other; makes one still more stupid; couldn't study. It befogs the front part of the head. It's mean, stupid, selfish, low. He'd be a brute; very near a lunatic; every one would despise him; something like Guiteau except as to intellect; he wouldn't see any harm in anything he wanted to do."

10th. Silver placed underneath, corresponding to the perineum; zinc as before. "When one gets this way they should be locked up; not capable of taking care of themselves at all; would hardly have sense enough to feed themselves. I'd soon lose all power of thinking; the mind seems a blank."

11th. Silver removed to inner and uppermost part of the thigh. (Region of Temper or Rage.) "That's better; under this one would take care of himself. It's strengthening to the muscles; one would have strong muscles. It's not intellectual but strong and hearty; would make a good day laborer; more quiet than stirring, but would fight very quick. If started he'd get wild. He wouldn't have much self-control; he might commit manslaughter. He'd fight like the devil; not combative, but wild when started, and very easily started."

12th. Zinc as before; silver still lower on the back of the thigh. (Region of Turbulence.) "That's better; more intelligent and active. This would suit an athlete; good for running and jumping; not content in any quiet life; impossible to be quiet; if in a riot he'd fight to work off his superfluous strength. It's very exciting and stimulating to the muscles, but not very devilish; must work off animal force."

13th. Silver to side of hip; zinc as before. "There is more sense and less force in this; I like it better. I'd enjoy life well and listen more to reason; would enjoy society very well; would like to be in lots of amusement, chiefly in lively society; I'd laugh a good deal, very hearty, and take in all the funny; laugh and talk, not stir about much." (This was the region of Vivacity.)

Some experiments were made with the Faradic current, but his sensibility was too acute to bear it, though I procured a brief toleration by using carbon electrodes. The current was more than he could endure, and after several trials he felt that the shock to his nervous system disqualified him for any of the usual experiments; but this was overcome by rousing the serene and sensitive regions of the shoulder and sternum. The momentary trials, however, developed distinctly the compound energy of the spots reached by the two

poles; such as Health and Health, Health and Hope, Health and Vital Force. In each case the force of both organs was distinctly realized as long as the current could be tolerated.

Returning to the galvanic plates, I placed the silver at the lumbo-sacral region and the zinc at the mammæ; the response was not as prompt as usual, but he felt that the influence was a sexual invigoration. Reversing the plates, the silver above the mammæ produced a quiet, yielding, non-resistant nature, according to the Christian precepts, but so different from his usual mood that he called it pusillanimous.

2. Zinc at the lower end of the dorsal vertebræ; silver below umbilicus (at and below Calorification). "This is warming; it would stimulate the pelvic organs generally."

3. Zinc on thorax at Coolness; silver at epigastric region. "This stimulates the stomach and increases digestion." Silver was then removed to the hypochondria, left side. "This produces nausea; the stomach is deranged; the temperature is higher. I feel feverish, with disgust for food; it would give me chills and fever or bilious fever." Plates reversed. "That changes it; I would hold on to this a while to get over the effects."

4. Zinc at Chastity; silver at lumbo-sacral region. "This is invigorating; one would move with considerable alacrity; it is stimulant rather than tonic; strengthens virility; increases action generally."

5 Zinc at Nutrition; silver successively at Energy, at Mortality, and at Sublimity and Reverence. The influence dispersing nutrition and favoring the reduction of flesh appeared to be more completely reducing and debilitating with the negative at Mortality, more exhaustive by activity under the influence of Energy, and more healthily productive of reduction through the influence of the upper part of Sublimity (posterior to mammæ.)

6. The zinc being applied to the region of Irritability, which affects the liver, and the silver to that of Patience, the latter was too dry to start the current, and some irritability was felt from the sole influence of the zinc. Moisture being supplied, the current was established, and a quieting influence was felt. The silver was then removed to the region of Health, and the effect felt was a wholesome stimulation of the liver.

These experiments, which might be prolonged *ad infinitum*, are sufficient to show that the Faradic energizes at both poles when applied to the body, and consequently has a great range of beneficial application, while the galvanic current has great power to change the balance of functions, and is efficient for suppression as well as development.

May the reader expect to reproduce phenomena such as I have described? Not unless he selects constitutions of the highest grade of impressibility. Nevertheless, similar phenomena will occur with lower grades of impressibility, by longer continuance and stronger currents. But where there is less mental impressibility the effects on the mind will be less conspicuous, and the physical or physiological effects will be more prominent.

It is difficult for anyone to realize these psychic transformations who has not become familiar with the higher forms of impressibility, and the reader may find it more instructive to read reports from lower grades of impressibility.

The application of galvanic currents to the head would be justified by the experience of their superior utility in affections of the spinal cord, and this view is sustained by the experience of Onimus and Legros, who say: "We have many times passed currents through the head, more or less intense, but never in persons of any age have we had the least accident. Hence we are persuaded that in many cases of cerebral excitation and intra-cranial trouble in the circulation, perhaps even in certain cases of delirium, we might obtain great benefit from continued currents, and facts that we have had occasion to observe confirm us in this opinion."

"In a number of cases in which we have had occasion to place the poles on the head the patients have manifested a tendency to sleep, and generally have had, the following night, a long and quiet sleep. This was especially marked in females with nervous affections."

Of course it would be unsafe for physicians to apply electricity to the head without understanding the brain. They would learn, of course, but at the serious expense of the patient; and it must be long before my discoveries can overcome the inertia of the colleges. The following experiments show the practicability of substituting electric currents for the application of the fingers.

A young friend, the very worthy and estimable Dr. Z., of a more impressible temperament than we often find, who had been practising a year or more in a New York hospital, sat with me to test the impressibility of the brain, and realized the results of every experiment nearly as well as Mr. K. but not quite as intensely. I tried seven different currents on the brain, with Galvanic currents of four to six cells.

The current from the lateral occiput (Adhesiveness and Sleep) to the centre of the front lobe was very exciting; when reversed it was recognized as dull and soothing.

The current from the temples (Ideality, etc.) to the base of the occiput, opposite side (Vital Force and Violence), was disturbing, giving a restless desire to be up and doing.

From the same occipital location to the region of Religion it was extremely pleasant and spiritual, giving the feelings that are produced in a grand temple or by sublime scenes.

The current from the same spot to the coronal suture of opposite side gave an aspiration for philanthropic life (which was characteristic), and brought up, by association, all the feelings of doubt, apprehension and responsibility associated therewith.

The current from the cheeks (Disease) to the organ of Health produced the best effects of all, — a feeling of enjoyment and energy; readiness for all the duties of life and desire to perform them.

The current through the temples (the Ideal region) produced a feeling of mental expansion and calmness.

The current from the lateral occiput to the lower part of the forehead produced a desire for profound study and investigation.

The intellectual and moral organs, being much the most active, responded more freely. The region of animal force and violence was less impressible, and the lower middle region of the occiput, which was small, yielded but very slight results.

To one thoroughly miseducated in materialistic views of science, and kept ignorant of all psychic and mesmeric literature, ignorant of what is going on in psychometry, clairvoyance, mesmerism, and too thoroughly prejudiced to read such literature, the foregoing experiments must appear as incredible as the telephone would have seemed to an ignorant blacksmith of the last century, and the balloon to the French peasants. If any such should read this page I would ask him to reflect whether any scientist with an honorable reputation would be reckless enough to offer such statements without a basis of fact, or could possibly be successful in teaching others to repeat the experiments and in convincing all who listen to him. The reading of such works as Dr. Esdaile's "Mesmerism in India" and Prof. Gregory's "Letters on Animal Magnetism" would enable him to discover how much he had lost by a false education, and prepare him to appreciate Therapeutic Sarcognomy.

CHAPTER XXIV.

ELECTRO-THERAPEUTIC APPARATUS.

Electric treatment — Electricity as a stimulant and in cholera — Batteries for electro-therapeutics, the different cells in use, their penetrative power — Combination of cell and coil — The common portable battery — Electric currents and their modes of application — The Faradic current, its use in infantile marasmus — Qualities of the currents — Galvanic batteries — Current measurement — Connections — Mode of application — Important improvement — Electrodes — Electric measurements — The coil and the cell combined — Currents applied to the human body and their modification and combination — Movable coil — Standard coil — Electric baths — Static electricity in nature — Its *rationale* misunderstood — Wires and electrodes — Static treatment by currents and shocks, not Faradism — Proper construction for this — Method of using static electricity — Its combination with other currents and with magnetism — Use of the static currents.

Not having found time to complete the treatise on electro-therapeutics, which I had hoped to publish, the importance of the subject renders it necessary that I should give in this volnme a brief outline of the electric treatment of disease, as I am accustomed to present it to my pupils.

When Sarcognomy becomes generally known, the electro-therapeutic treatment we have had heretofore, guided only by anatomy, without respect to the vital forces and sympathies of the nervous system, will be considered a rude and barbarous method.

The subject is greatly simplified by the general proposition that whenever we wish to concentrate and stimulate the vital forces the negative pole may be used, as we use the hand in manual treatment; while the positive pole should be used to produce dispersive effects, as we use the hand in dispersive passes.

The dispersive power of the positive pole, however, is not equal to that of the hand for dispersing morbid conditions, though it is capable of more exact and circumscribed application. Nor is the developing power of the negative pole equal to that of the hand, for it is simply a disturbing and stimulating influence and cannot impart the large amount of faultless vitality which the hand of a successful healer can give. Nevertheless, the greater power of electricity, which no human being can resist, gives it a very large sphere of activity

among those who are not sensitive to the hand. Galvanic and primary currents have a chemical effect, tending to accumulate acid elements at the positive pole and alkaline elements with hydrogen at the negative. Hence their use is to some extent irritating and requires to be handled with moderation.

In consequence of this the best application that can be made of electric treatment is that which combines the electric and nervauric methods by passing the electricity through the person of the operator, or at least through his hand. Any one who tries it will recognize the great superiority of the electro-nervauric method.

ELECTRICITY AS A STIMULANT. — Electricity, like caloric, is a powerful stimulant, an unlimited power, capable of killing or reviving, and therefore can be much more extensively applied than it has been in exhausted conditions as well as in narcotism and asphyxia, which it relieves when all else fails. Dr. Dewees said in the *New York Journal of Medicine*: "In cases of exceeding prostration, where the pulse was extinct, I have witnessed a return of impulse take place in a few minutes, and the sense of weakness fully as well overcome as by the administration of brandy or wine." Dr. Wilson Philip mentioned the suggestion of using electricity to recover from typhus, but Dr. Gale is the only physician who has extensively attacked fevers with electricity.

CHOLERA was successfully treated with electricity by Dr. C. F. Favell of the Sheffield Cholera Hospital, but his success has not inspired the profession to bring electricity into use in such cases. In a case that seemed moribund in spite of medical treatment, he applied galvanism from the wrists to the ankles and from the neck to the pit of the stomach, improving the pulse and voice and giving a disposition to sleep, as Sarcognomy would indicate. The patient progressed to recovery, which was ascribed entirely to the galvanic treatment.

In another case, with cold surface and pulse nearly gone, galvanism was repeatedly used and believed to have produced the cure.

Dr. F. claimed that very decided and immediate benefit resulted in every cholera case in which galvanism was used.

Dr. Vigouroux, in the "*Progres Medical*," maintains that daily static electrization is the best measure of prophylaxis against cholera. This is doubtless true, as electric conditions are greatly disturbed in cholera seasons.

Chickens and pigeons subjected to etherization were found by M. Ducros to require seven or eight minutes for natural recovery, but were restored instantly by shocks of static or dynamic electricity. They recovered in about thirty seconds when charged with positive

electricity on the insulating stool, but their recovery was only retarded when under the negative influence, which shows that positive electricity is a real power, and the negative a mere negation, like cold, — not a different electricity, but a deficiency. And yet we find all through our scientific works a recognition of two electricities. We might as well recognize two forms of caloric — a positive hot and a negative cold.

BATTERIES FOR ELECTRO-THERAPEUTICS.

The contamination of electricity by the substances through which it passes leads me to consider all cells objectionable which contain sulphate of zinc, sulphate of copper, sulphate of mercury, chloride of silver, sulphuric acid, bichromate of potash, mercury and zinc and other unwholesome elements. Such cells impregnate the system with harsh medical influences and leave it saturated with a metallic influence and taste. There is no necessity for using any of these except the zinc, since cells containing muriate of ammonia have proved efficient and satisfactory.

The Leclanche cell has carbon and zinc elements, the carbon in a porous cell, surrounded by peroxide of manganese mixed with coarsely powdered carbon. This is placed in a jar containing a solution of muriate of ammonia (sal ammoniac). The polarization of the cell is checked by the oxygen of the peroxide of manganese, which combines with the hydrogen set free. Chloride of zinc is formed in small quantity.

In the chloride battery of Fitch, which relies also on muriate of ammonia, depolarization is assisted by the bichloride of mercury in very small quantity, which seizes the hydrogen and is converted into calomel. The Samson cell, which has become very popular, is also a muriate of ammonia cell, similar to the Leclanche. The Law cell is similar to the Samson, both being satisfactory. These are the four forms of cells which I have been accustomed to use and recommend as the least objectionable. We need only to substitute iron for zinc in these muriate of ammonia cells to have an entirely unobjectionable cell; but this is impracticable, as it would reduce the electric energy very low, and the iron would not escape corrosion like the zinc. The Stohrer battery, of zinc and carbon, with sulphuric acid and bichromate, has a vigorous current with this objectionable character which I have mentioned, and Bartholow says it will "give rise to great irritation and burning," from the same number of cells which would be agreeable in the improved Daniell battery, which has no bichromate or free acid and has more resistance. Cells of a good size are necessary to furnish a good volume of electricity, but as the electro-

motive force depends on the number of cells, twenty small cells will send more through the human body than the same amount of plates arranged in three or four large cells, which would have less penetrative power. The lack of electro-motive force in the large cells may be compensated by the use of a coil which gives this force, as we see in the common portable battery, in which a single cell with a coil sends out strong currents. This principle I have adopted in my new battery to produce a galvanic current.

The current from a single large cell would ignite and perhaps deflagrate a fine platinum wire by its volume, but twenty common cells would produce very little heating effect, though more efficient medically by their penetrative power. Even the current of a single common cell of 1.5 volts with the aid of a helix will produce as strong an impression through the human body as we wish to bear, because its power goes through us. It requires *very little* electricity to affect the human constitution; there is very little in the most powerful Faradic current, and still less in the more powerful static, even when it shocks or kills; but it requires some volume to produce chemical and alterative effects on the blood and tissues, though very little volume is requisite to produce revolutionary impressions on the nervous system.

What can be done by my method of a few large cells combined with a coil has not yet been fully tested, but I am confident it will be one of the most powerful agencies of electro-therapeutics. The coil has heretofore been used only to reinforce the interrupted current, not the continuous galvanic.

By this combination, which I may call an invention (simple as it is), for I have seen no mention of it in my reading on electricity, we realize the full power of a large galvanic battery, with a very few cells; the efficiency of the current receiving something near a tenfold increase by the use of a magnetizing coil, so that a small portable battery of four cells may furnish all the galvanic power that a physician is likely to require, besides sustaining primary and secondary currents of greater power than he is likely to need, by means of which electro-medical currents can be propelled through the body or sent any distance by wires. The patient in the fourth story may receive any anodyne, soporific, stimulant or alterative sent by wire from the first story.

The immense power of electro-magnetism in reinforcing an electric current relieves us from the necessity of using large galvanic batteries. The single cell of the common portable instrument is raised to a power as high as one can bear by the iron rods in the coil. The most splendid illustration of this law was exhibited in a Rhum-

korff coil at the London Polytechnic Institution which was nine feet ten inches long and two feet in diameter. It had a soft iron core of one hundred and twenty-five pounds, five feet long and four inches in diameter, surrounded by a primary wire about two and a seventh miles long, around which was the coil of secondary wire one hundred and fifty miles long! This coil, run by forty-eight cells, yielded a flash of electricity "twenty-nine inches long and capable of perforating five inches of solid plate glass"!

On the other hand, a very feeble galvanic current steadily applied may produce the most important results; as my experiments show that a very sensitive individual, even with a vigorous muscular constitution, may experience strong psychic and physical effects from two small plates. What is called sometimes the Humboldt battery consists of two plates (such as silver and zinc) which are applied on the body and connected by an insulated wire so that the current flows from the zinc to the silver through the body. Dr. Grapengeisser has reported a case of restoration of lost voice by applying a zinc plate as large as a shilling and a small silver plate to blistered surfaces, on each side of the larynx. It was first applied half an hour, producing convulsive movements of the larynx, and five days afterward applied again and kept on all night, making a cure. About thirty years ago, Dr. De la Rua of Cuba, who republished in Spanish my illustrations of Sarcognomy, informed me that he had small galvanic plates attached to his walking cane, which he used upon some of his patients.

The common, cheap, portable battery is an arrangement by which one galvanic cell is used to produce a current from the positive carbon or copper pole to the negative zinc pole, which current has so little electro-motive force it would be of no therapeutic value, not being able to penetrate through more than fifteen or twenty inches of the body, so as to be recognized by any but the most sensitive.

This feeble current, however, by being conducted around an iron rod or bundle of wires in a coil of many turns, creates in this iron core a strong magnetism which reacts upon the current, giving it great electro-motive force, so that it may be sent through the whole length of the body.

But the efficiency of electricity depends more upon its impact than upon its current. A current which flowing steadily is scarcely recognized as it passes through the body, makes a strong impression or gives a shock when it strikes in successive blows. Hence the interruption of a current, so that its stroke or entrance is rapidly repeated, giving a vast number of shocks, makes a powerful impression.

This end is attained in the portable electro-magnetic battery by a very ingenious invention. The current passes through a screw to a

spring which is almost in contact with it, and as soon as it passes and develops magnetism in the iron core the attraction of the magnet on the spring pulls it farther from the screw, so as to stop the passage of the electricity, and by stopping the electricity it arrests the development of magnetism and leaves the spring free to fall back and receive the current. The wonderful rapidity of this operation produces a buzzing sound. Its rapidity is due to the fact that copper is a perfect conductor, superior to everything but silver, and that electricity has a speed which would rival that of light, if it were not retarded by the mediums through which it passes. Kirchoff decided, theoretically, that electricity without resistance would travel 192,924 miles in a second. But it never approximates that. Professor Gould found a velocity of 12,000 miles in telegraph wires at a moderate height, but they may be raised high enough to give a speed of 24,000. Prof. O. M. Mitchell, in an experiment with the telegraph at Cincinnati, demonstrated a speed of over 30,000 miles in a second. But submarine cables transmit slowly.

This rapidity explains the rapid buzz of the spring as the currents are broken, and the powerful impression this makes on the human constitution as the wires conduct this agitation to the patient. A careful study of the subject shows that the shocking impression on the patient is due to the discharge of the electricity in sparks at the moment of interruption.

Equally wonderful is the action of the exterior coil, which is affected by induction, being entirely separate from the interior coil. That the interior or primary coil should start a powerful action in the exterior coil is due to the law developed and applied by Faraday, that a current in one wire starts an opposite current in an adjacent wire. The current in the primary wire starts an opposite current in the exterior coil when it begins to flow. Hence we would expect the poles of the exterior coil to be opposite to those of the interior, the current being in an opposite direction, but they are not; for, when the interior current is interrupted, the exterior current flies back in the *same* direction as the interior, and this reactive current being stronger than its opposite, it follows that the Faradic current coincides with the primary, as to its positive and negative poles. But the difference in the two poles is not so great as in the primary, which is a one-way current, while the Faradic is a reciprocal or two-way impulse.

Hence, while the primary current, though interrupted, is like the galvanic, emphatically positive and negative at its poles, and capable therefore of decomposing water or being used in electroplating, the Faradic, by its alternating action, counteracts itself as to decomposition and produces no perceptible chemical effect, and no opposite condi-

tions at its poles, but simply serves as a vital stimulant to nerves, muscles and bloodvessels, but somewhat more effectively at its negative pole. Hence the use of the Faradic current is very simple, and we apply the two poles on the right and left sides of the body to organs that we wish to stimulate. There is a very energetic force in its action, which is sometimes too harsh, and its best or most agreeable effects are produced when the coil is made of a great length of very fine wire. The Faradic coil recommended by the Electrical Congress at Paris was composed of wire one-hundredth of an inch in diameter and over three thousand feet in length.

The strength of the currents is regulated by a brass or copper shield, a tube which fits around the iron core and, when it covers it, deprives the coil of its magnetic influence. The power of the coil is developed as the shield is pulled out.

ELECTRIC CURRENTS.

If the human body had the conductivity of copper or iron the contact of a single common galvanic cell would be fatal. But as it is, the contact of a one-volt cell sends through the body not more than a tenth or a fifth of a milliampere, and it would require ten such cells to produce one or two milliamperes through the trunk. Hence fifty cells would be required to produce an effective current, unless applied to a small portion of the body. But these numerous cells, it is said, produce only electro-motive force, as they furnish no more electricity than a single cell, and not as much as a single large cell or a pair of cells combined to act as one. Hence, if we unite two or three cells to act as one, and add to them a sufficient electro-motive coil force, we shall have a greater galvanic power than twenty-cell batteries afford, in a compact and portable shape.

In applying the current our object is to produce beneficial and avoid injurious effects. Injurious or caustic effects are produced by concentration and avoided by diffusion. Broad electrodes are of course preferable to small ones. A broad wet sponge or wet piece of cloth gives the soothing influence of moisture; a moist carbon electrode has a good influence, and the most objectionable electrodes are those of metal which are in common use, and which tend to burn the skin, but which may be made more agreeeable by a broad surface.

When we wish to produce a caustic effect we use very small metallic surfaces; that is, we insert needles in the parts to be destroyed, which operate either by burning, if a sufficient amount of electricity is furnished, or by chemical decomposition, or by both. The positive pole attracts oxygen and may become corroded, and the

negative attracts hydrogen and alkalies caustic enough to dissolve the tissues, for pure alkalies are intensely caustic. Broad electrodes resist this caustic tendency, and we resist it still further by moving them about over the surface, especially the negative.

When we wish to produce the sharpest effects of electricity we use metal electrodes. Thus a very small knob or nail pressing against the skin with a Faradic or a galvanic negative current produces a burning sensation like hot iron. A wire brush with an electric current brushing over the skin also produces a burning sensation. Sometimes a tinsel brush is used to strike or brush the skin, which is also painful. If such applications are held on the skin they burn like a moxa, and are called an electric moxa.

A wire heated by an electric current burns through the flesh, and this method of galvano-cautery appears to have great advantages over the knife, having been successfully applied to hemorrhoids and polypi. Dr. Carl Seiler has removed nasal polypi in this way, and thinks it the only way to prevent their return.

Another metallic application is the use of needles in *acupuncture*. Needles two to four inches long, not insulated, are inserted into muscles. The static current was applied to them over fifty years ago by Sarlandiere at Paris, which struck the fancy of the profession immediately. Since then galvanic and Faradic currents have been used on the needles. The positive has some indifferent connection, and the negative is used to touch the needles and start muscular contraction.

We aim to produce the effects of a current, but not the sudden impulse which makes a shock. Shocks are produced by interruptions. The interruption of the static current causes it to move in a spark, and shock when it has force enough to make its way. The spark between the conductor knobs is accompanied by a shock to the one who holds the electrodes connected with jars.

When a galvanic current of any considerable strength, from a number of cells, or from a single cell reinforced by magnetism, is passing through conductors, and its passage is interrupted so as to force it to travel through electrodes held in the hands, its passage produces a decided shock. It is upon this principle that the common portable battery works. The primary galvanic current passes from the carbon to the zinc through the primary coil and is not felt in the electrodes until the current is broken by the magnet attracting the spring from its contact with the screw. This forces the current through the electrodes and the one who holds them. But this is momentary, as the contact is immediately renewed when magnet ceases to act (for want of a current), and the current again flows in

its former route, without reaching the subject. Thus the primary battery current is a succession of fine shocks which all pass in one direction. Being a one-way current or shock, it retains the galvanic character, but has not the same chemical power as the uninterrupted galvanic current.

The FARADIC CURRENT or shock, as a general stimulant, has a very extensive applicability to rousing impaired organs. It has even been applied to the kidneys in a case of diabetes, by Dr. Clubb of England, with the effect of reducing the urine to one-half its previous amount in the course of six weeks.

Its applicability to stimulating the growth of young animals was demonstrated by Dr. Beard upon puppies, and its applicability to patients exhausted and moribund, especially when applied through the hand of the operator, conveying his vital force, is easily shown. I would recommend in all cases of impaired vitality, endangering life, the use of a Faradic or alternating galvanic current, combined with vital force and with the remedy that seems most necessary.

Dr. H. T. Webster of California has fully realized the value of the Faradic current in infantile marasmus. He says: "An emaciated infant, which has become wan and haggard through imperfect assimilation of food, or the prostrating effects of cholera infantum or other depleting disease, and in which digestion is impaired, and the nervous system disturbed, in which there is almost constantly hectic fever present, with exhaustive alvine evacuations, in many cases passes in time beyond the boundary line where drugs are capable of exerting any beneficial influence." In such cases, he says: "Faradism here is capable of establishing for itself a reputation which will stand unrivalled." His method is "to apply in these cases the positive pole at the feet and the negative pole at the nape of the neck, regulating the current to a mild force, and allow the poles to remain three or four minutes. Then place the positive pole at one foot, and hold the negative at the opposite hand, for the same length of time; then place the positive at the opposite foot and hand as long. A child that has not rested for weeks will, in a few nights after the beginning of this plan, rest quietly all night and begin to gain strength and flesh."

This is indeed very good treatment, and yet it may be improved by adding currents from the abdomen to the shoulders and the area below the shoulder-blades, also alternating currents between the abdomen and lower dorsal region and between Nutrition and Health. The latter would be especially valuable.

Dr. Webster very justly maintains that better effects may be produced by giving the currents as described through a warm bath,

which is true, as the water softens the electric action, sends its own soothing influence through the person and receives therefrom the morbid aura. In a strong salt-water bath the greater conductivity of the water would tend to diffuse the electric influence over the surface, while in pure water the current would be more confined to the person.

SOFTNESS OF CURRENT is produced (1) by limiting the strength of the battery supply, (2) by limiting the influence of the core and of the primary coil by a shield, (3) by increasing the length of the wires and diminishing their size. Each of these methods diminishes the quantity and force of the current, and may thus be equivalent, — except the method of diminishing the size of the wire; this diminishes the quantity of the current, but increases its intensity or penetrative capacity.

As the primary coil requires a good quantity for its galvanoid effects, it is proper that it should have as usual a coarser wire, which may vary between No. 20 and No. 18. The exterior secondary coil may vary between 25 and 32, as it is designed to act with force, but not to produce chemical and vital changes incident to galvanism. If the exterior coil has great length of fine wire, its action will be more gentle and penetrating.

A single Samson (muriate of ammonia) cell is sufficient for medical practice with the helix, but two or three cells may be used when additional power is needed to overcome resistance.

Experience, I believe, has shown the superiority of a helix containing a great length of fine wire, which offers considerable resistance, supplied by a current from three or four cells; the additional cells being needed on account of the resistance. A single cell would not be sufficient for a helix of very long and fine wires.

The cylinder or shield of non-magnetic metal, which interrupts the magnetic influence of the core which it incloses, gives us great delicacy in adjusting the strength of the current. The current is also subdivided, with less delicacy but more definite measurement, by taking it from different parts of the exterior coil. One post is connected with one end of the coil and the other posts with different lengths of the coil. Any number of subdivisions may be made in this way.

Another method is to add one or more induction coils, exterior to the first; but all the variety required may be obtained by having two sliding coils of the same diameter, one of moderately coarse and the other of very fine wire. With these we may make any combination by a sliding coil with the primary currents, and the strength of the combination may be definitely modified by a shield graded in ten

divisions. With these arrangements we may produce two hundred variations of currents.

There is a characteristic of the portable battery which has not been mentioned; viz., that a short metallic circuit between the electrodes or their binding posts reduces the vibrations or arrests them entirely unless the galvanic current is strong. The sudden arrest of the battery by touching the electrodes together is very remarkable.

The common batteries, in which a coil is wound with about sixty feet of wire to produce the primary current, reinforced by the electromagnet in the coil, are not quite satisfactory. So limited a coil gives so feeble a primary current that the chief use of the instrument is for the more powerful Faradic current, and thus the primary, which should rank high as a current of great general utility, is thrown out of its proper rank. The coil for the primary should have at least one hundred and fifty feet of wire to yield a strong primary current, and when the rheotome or interrupter is closed we have a mild galvanic current, — the current of one or more cells reinforced by the magnet, properly magneto-galvanic. A portable battery should have three or four cells to enable it to act efficiently in giving galvanic as well as primary, Faradic and combined currents. Thus galvanism would be made much more available than it is at present when it requires an expensive non-portable battery.

Galvanic Batteries. — At present the only very efficient portable galvanic batteries are those run by sulphuric acid and bichromate of potash, which I cannot sanction as the source of a truly wholesome electricity. They are also powerful at the beginning but rapidly declining as used. They require the zinc to be taken out of the acid when not in use and the acid solution to be frequently changed as its value declines. The chloride of silver battery is neither cheap nor durable.

Dr. G. B. Massey says: "My experience with the gravity cell has convinced me that it is entirely out of place in a physician's battery, being exceedingly dirty from the constant accumulation of creeping sulphate, and unreliable owing to the rapidity with which evaporation breaks the circuit by depressing the water surface below the horizontally hung zinc." "It is only economical when engaged in constant action, under constant supervision, as in telegraph offices."

Galvanic batteries with few plates and large surfaces are used to supply a heating current, which when passing through a platinum wire (which has great resistance) may heat it red or white hot, so that it may be used to turn through any morbid structure, and thus supersede the use of the knife, with less danger of hemorrhage. The

Piffard galvano-cautery battery and Trove's polyscope are the forms now in use.

The *positive and negative poles* may be distinguished by their impression on the tongue, or by the stronger influence of the negative on the hand — also by their action on the galvanometer, or on a mixture of iodide of potassium and fluid starch, which will bring the iodine to the positive pole, making the starch blue. In attempting to distinguish the poles, however, we may be misled by feeling. If the hand that holds one is more sensitive than the other, the comparison will not be fair. All parts of the body vary in sensibility — hence, to compare the impressions, parts of equal sensibility should be used and even, when we do this we may be deceived by the electrodes. A broad electrode with a moist contact makes a much feebler impression on sensibility than a narrow or small electrode with metallic contact on a dry skin. The burning sensation of the negative is promoted by a dry skin.

CURRENT MEASUREMENT. — An approximate estimate of the force of currents is made by a galvanometer. The tangent galvanometer is reliable for this purpose, but the milliampere-meter (usually selling for $25) is also a safe guide. Patients are usually treated with from one to fifteen or twenty milliamperes, but over a hundred and fifty have been used on morbid structures at the womb.

We may guide our treatments in galvanism by the number of cells used, estimating the Daniell cell as having the force of one volt, the Leclanche, the Law or the Samson at 1.3 to 1.5, and the more active (sulphuric and bichromate) cells at 1.5 to 2 volts when first connected.

CONNECTIONS. — For the purposes of connection the most efficient and cheapest thing is the insulated copper wire used for telegraph operations. It is insulated in various ways, any of which are satisfactory,— the most perfect insulation being with gutta percha or India rubber, which should always be used for static electricity. The wires can be easily cut and the insulating material removed. There is none of the difficulty in inserting them into binding posts or fastening under screws which often happens with the metal tips of conducting cords. A steel wire gives the advantage of being available in an elastic coil. Copper is too soft to maintain its form. The steel wire should be about two and a half times as large in diameter as copper wire for the same facility of conduction.

MODE OF APPLICATION. — In applying chemical or dynamic electricity, much difficulty arises from the necessity of a moist contact with the skin. This difficulty, which necessitates undressing, I partly overcome by a long-handled elastic electrode, 16 or 18 inches

long, which can be inserted and applied on almost any part of the body by loosening and opening the clothes, and can be applied easily by the patient. The best method, however, is to treat the patient in bed, or to substitute for the ordinary clothing a blue flannel gown with a number of vertical slits through which access can be had to any part of the body. It is a mistake to suppose that mere contact with the feet or hands can be a satisfactory method, or that it is a good treatment of all the parts on the route of the current. It is not the route of the current that is chiefly important, but the points of contact for electrodes. The advantages of the static in treatment over the clothing must give it pre-eminence in practice.

An Important Improvement. — The essential change which I long since promised to make in electric apparatus consists in rejecting the harsh elements through which the electricity passes and substituting those which are more wholesome. Sulphuric acid, bichromate of potassa, bisulphate of mercury, zinc and sulphate of zinc are not the elements with which one would like to be saturated. It is true they are not physically transferred to the patient and do not permanently lodge in his body, but, as their potentiality is conveyed, the patient finds himself saturated with metallic and injurious influences, which compel him to suspend electric treatment with a metallic taste in his mouth which belongs not to the electricity but to the metals that convey it.

We make a great change when we substitute for the battery fluid a solution of muriate of ammonia, one of the most wholesome substances known — a gently tonic, antiseptic alterative, closely akin to that indispensable element of the blood, muriate of soda, but possessing more active stimulant and alterative properties.

In the muriate of ammonia cell we have no offensive vapors, and it is not necessary to lift the plates out of the fluid as soon as we are done using them, to prevent their destruction. The battery stands unchanged from year to year, ever ready for use, and has great durability.

The Rheotome or Vibrating Spring is the most delicate and important part of the common battery. If the spring be too weak it yields too promptly, before the full force of the current is developed. It should be strong enough or remote enough from the magnet to allow the full strength to be developed before it moves, in which case its movements are slower. By screwing up close to the magnet the interruptions are made more frequent and the current more delicate. I have endeavored to construct a rheotome that will be always reliable and also susceptible of considerable variation. In

some batteries the rheotome admits of no variation, and unless very accurately adjusted will not operate at all.

ELECTRODES. — The most common electrodes, an inch or inch and a half in diameter, are too small. Two and one-half or three inches is small enough. The purpose of the electrode should be to introduce as much electricity as practicable with the least irritation or disturbance. A large electrode greatly increases the facility of the introduction and diminishes the irritation at the contact with the body. A pair of specially large electrodes, five or six inches in diameter, would prove useful in cases requiring a good current but too sensitive to its application.

The electrode should be covered with a cap of canton flannel, a strip eight or nine inches in diameter retained by a rubber band, wet with salt water (saturated), which will moisten the skin and conduct very freely. This is necessary, as a dry skin offers about as much resistance as the entire person.

To administer a medical influence, a pledget of absorbent cotton, saturated with the medicine in a fluid form, may be placed under the cotton flannel, which should be wet only far enough to cover the medicated cotton. The best method, however, is to use the medical electrode, in which the medicine is concealed, is always ready for use, and leaves nothing on the skin.

The best material by far for the electrodes is carbon, which should have a wooden backing and handle for strength, and a diameter of two and one-half or three inches. The carbon is free from oxidation, and imparts a soothing influence very different from that of metal. Small carbon electrodes may be used for limited applications.

Next to the carbon and cotton, which are easily changed and kept clean, the wet sponge may be recommended, which is also a convenient channel for medical liquids, but is not so cleanly.

The irritative effect of the positive pole may be diminished by increasing the size of the electrodes and the amount of water on their surface, as well as by various soothing medical liquids. Alkalies, soap, althea powder and hyoscyamus may be used. The irritant influence of the negative pole may be reduced by enlarging its surface, or the obstruction by a rheostat.

When the object is to irritate the skin, a metal brush is used. The interrupting electrode is used when we wish to break and renew the current, which is convenient for diagnosis.

The commutating electrode, which produces what are called "voltaic alternatives," is important when we wish to make a galvanic or a primary current equal at both poles, and thus make it a powerful and equable stimulus.

A long-handled electrode is valuable for making applications under the clothing. The gliding treatment over the body is made more facile by a roller electrode, which makes diffusive stimulation easy.

There is no electrode so beneficial and adaptable as the human hand, which may give strong currents without irritation and impart the vitality of the operator. A wet linen glove of crash material is sometimes a useful addition.

For surgical use in galvano-cautery and for gynecological practice a variety of electrodes are used which I need not describe.

ELECTRIC MEASUREMENTS. — The operator whose nice sensibility and psychometric perception enables him to realize the true character of each current may not need the instruments of exact measurement, except in recording and describing his treatment in the use of galvanism, which alone is measurable. But for scientific accuracy he needs to understand electric measurement and description, which portrays the exact amount of galvanic electricity used upon a patient as nearly as instruments can record it, — the amount used being what the electric force is competent to carry through a certain amount of resistance. But I must confess it does not clearly appear that any measurement by instruments is an exact expression of the vital effect of a current.

The electro-motive force is expressed in VOLTS, the resistance in ohms, — names derived from Volta and Ohm. The VOLT signifies an electric power competent to produce a movement of one metre (39.37 inches) a second through one gramme (15 grains), and this force is about what we find in one Daniell's cell (such as is commonly used). The Daniell cell, lined with a sheet of copper, holds about a gallon, and about two-thirds of its content is occupied by a saturated solution of sulphate of copper; and a porous cup, holding a fluid of which one-ninth is sulphuric acid, is placed in the centre of the jar, and a bar of zinc amalgamated with mercury inserted in the cup.

This cell is passive when the current is not flowing, but yields a volt of force when its poles are connected. The most active cells (with sulphuric and bichromate fluids) yield about two volts.

The OHM of resistance is what is offered to the current by two hundred and fifty feet of copper wire one-twentieth of an inch in diameter, hence a very minute amount.

The wire of the primary coil of a portable battery sixty feet long and one-eighteenth of an inch in diameter would offer not quite one-fifth of an ohm of resistance, but an exterior Faradic coil wire one twenty-eighth of an inch in diameter and two hundred feet long would offer a resistance of nearly 1.6 ohms. A wire of one-thirtieth, four hundred feet long, would offer a resistance of 3.6 ohms.

If the power of one volt operates through one ohm of resistance, it transmits a certain quantity of electricity per second, which quantity is called a COULOMB, and an AMPERE is the current of one COULOMB per second. The amperes are measured by a meter which is called a milliampere meter. The milliampere is not a thousand amperes, but the thousanth part of an ampere.

When we have galvanic batteries yielding from five to fifty volts of force we might expect a vast number of milliamperes to pass through the human body; but as the resistance of the body is between two and three million times the resistance of a similar mass of copper, only a small amount of electricity passes through it without a strong voltage, such as is furnished by numerous cells or the motive force of a coil containing a magnet.

The body and limbs together offering a resistance of about fifteen thousand ohms would require a battery of fifteen volts to produce a current of one milliampere. Hence batteries of fifty to a hundred cells are required to produce efficient currents between the hands and feet, though batteries of ten to twenty cells are sufficient for short currents. A current of ten inches through the flesh from ten cells of 1.5 volts each would be strong enough for general use, being about seven or eight milliamperes.

Without pretending to any accuracy, which the nature of the subject does not permit, I would say that for galvanic currents in the human body of adequate strength we require one efficient galvanic cell, such as the Law or Samson, for every inch in the length of the current.

But why do we require this multiplication of cells which adds nothing to the galvanism but electro-motive force to compel its circulation in the flesh? A single cell of larger size would furnish a greater volume of galvanism than the largest battery, and if to this cell we add the electro-motive force of an adequate coil we produce a greater effect than the largest battery of cells would produce.

Upon this principle I have constructed a small portable galvanic battery, which possesses all the power needed in galvanic treatment, yielding a current which easily flows through the length of the body, and which requires a rheostat to moderate its action. Such a rheostat I have constructed on a simple and convenient plan.

The reader will perceive from these statements that the electro-magnetic and galvanic currents are different, the former having what the latter has not, great penetrative power or electro-magnetic force, making it more available in electro-therapeutics. When the two are combined, as by union of the coil and cell, the galvanic current is carried through the system by the electro-magnetic, as efficiently as it

is in the common portable battery, and the power thus united with it is in some respects preferable to the galvanic. Those who feel the currents prefer the electro-magnetic.

CURRENTS APPLIED TO THE HUMAN BODY. — Our text-books are not at all clear in reference to the relation between the human body and the electric currents. They tell of volts and ohms, but give little instruction as to the relation of one to the other in the human body.

We know that the conductivity of the human body is similar to that of a weak solution of salt, and is chiefly developed in its fluids, being greatly less in the hard and solid parts and adipose materials. Parts well filled with blood, such as the viscera of the trunk and the brain, are good conductors, while bone, tendon, epidermis, nails and hair offer great resistance. Weber makes the curious statement that the resistance of the tongue is equal to that of the whole body. Nevertheless the current of a few cells, which would not pass or be recognized through the body, will produce an intolerable burning if passed through the tongue. The tests derived from passing currents through German-silver rheostats are not a correct criterion of the effects on the human body. A current with electro-motive force making it five times as efficient as another may show no appreciable difference when tested by such a rheostat.

We are told by the measurements of Dr. Matthiesen that the conductivity of copper is more than 2,900,000 times as great as that of salt water. Hence we learn that the length of a copper wire is of little importance if currents have any force. But as the conductivity of a wire is inversely as the square of its diameter, a copper wire may be fine enough to offer sensible resistance, and a fine wire of German silver offers resistance enough to be used as a rheostat or current obstructer.

The resistance of the human body is in proportion to the length of the current through it, and in inverse proportion to the thickness or diameter of the parts — in other words, it passes more readily through the trunk than through the limbs, when there is not an adipose obstruction.

A current through the body may be from hand to hand or hand to foot or foot to foot. The difference is said to be not very great, though the distance from hand to foot is greater, and I find the resistance fifty per cent. greater. The resistance offered by this tract has not been stated in the common text-books. Meyer quotes the very opposite opinions of Pouilliet and Lenz, without expressing any opinion himself. Pouilliet's incorrect *estimate* would make it nine hundred and sixty-one ohms. Of course this was only an estimate,

not a measurement. The estimate of Lenz and Ptschelnikoff would make it about one thousand seven hundred and sixty ohms. These are strange statements to be found in a work by Meyer, translated by Hammond. I have found a resistance from hand to hand in myself to be about ten thousand ohms, and from hand to foot fifteen to seventeen thousand ohms.

But what relation this resistance bears to galvanic and primary currents our text-books do not explain. They leave us to find out what amount of current we are getting by a milliampere meter, which is applicable only to the galvanic battery. For the primary and secondary currents we have no test but the sensibility of the operator and subject, and I believe the sensibility of a psychometric operator is the very best test, for he can recognize qualities in the current which no instrument can express. The electro-motive force of primary, secondary and static currents is so great as to seem beyond computation.

The primary current, having much of the virtue of the galvanic, has a propelling force which makes it efficient in currents through the body which would require a very large galvanic battery; but in portable batteries, generally, the primary is made too feeble in comparison with the secondary. Tested by its power of overcoming the resistance of a rheostat, the primary current does not equal the galvanic cell which originates it, while it permeates the human body with the force of fifty or a hundred cells. Our text-books speak of electro-motive force of currents, as if they were correctly measured by the number of ohms which they overcome in passing through German-silver wires. But that kind of electro-motive force which is efficient in the human body is something very different, and on that subject we have received no explanation.

The failure of the primary current to overcome as many ohms of resistance as the cell which originates it may be due to the interruptions, for a separate coil added in a galvanic current increases its power of overcoming resistance, though not as much as it increases its vital effects. That vital effects are in some way different from, and not commensurate with, mechanical effects was illustrated also by the experience of Dr. Piffard, who found that a current from Edison's incandescent-light wires, though reduced by a rheostat to the proper number of milliamperes, was too painful in application, compelling him to substitute a similar amount from galvanic cells.

A current from one battery may have irritating and convulsive effects, when another battery may give the same number of milliamperes of current without any convulsive effects, as the current is changed. The cells containing muriate of ammonia have a much

milder influence than those containing the common sulphuric acid and bichromate solution.

When we apply ten cells with ten or fifteen volts of electro-motive force to the human body, with the electrodes but a few inches apart and the connections moist, we get an efficient portion of the motive force, but this declines as we separate the electrodes, and a current which is very strong on a short circuit becomes nearly insensible when it traverses the length of the body. This we may realize and estimate by introducing the galvanometer into the circuit. Ten cells would send but one or two milliamperes through the length of the body.

The electro-motive force of the primary and secondary currents is so great that we have no difficulty on this question, and the sensations of the operator are a sufficient guide. He should not administer any current which he has not tried on himself.

The diffusive power of battery currents in carrying medical potencies throughout the system demands that the electrician should also be profoundly acquainted with the materia medica, and should apply the appropriate remedy wherever he applies the positive pole, unless the remedy be one which may be decomposed, so that the positive pole will attract it. When we apply a solution of iodide of potassium to the surface (say in a wad of cotton) under the negative pole, the iodine will make its way through the body to the positive pole. But this question does not arise in using my medical electrode, the potentiality of the remedy being conveyed without its substance.

The strength of currents is regulated in portable batteries by a shield pulled out or pushed in, or by separating more or less the inner and outer coil. In the galvanic battery we regulate by the number of cells used, and a switch is arranged to take into the circuit any number from one upward. But we also regulate its strength by the resistance we interpose between the electrodes and the patient, or the resistance interposed by a rheostat between the battery and the electrodes. The method by resistance is better than by selecting cells, as it gives to all the cells the same amount of action and preserves their equality. An accurate knowledge of the resistance is obtained by using wire rheostats in which a certain length of German silver makes the hindrance. As German silver gives thirteen times the resistance of copper, a fine German silver wire is an efficient rheostat, and the best rheostat is arranged so that we easily change the resistance, as we wind the wires off the spool, and know how many coils we are using on the spool. This is the rheostat of Wheatstone. The rheostat or resistance coil gives us the number of ohms of resistance that we are using to check the current. Brenner's

resistance coils are not so simple in plan as Wheatstone's, in which the wires are coiled around a spool. The best rheostat that I have seen is the Bailey current regulator, which operates admirably and has the additional merit that it conducts the current through carbon, which is a beneficial method for the patient.

Cheap and simple rheostats may be made by using a glass tube filled with water, with corks in the end through which wires may be inserted, the distance between the ends of which determines the amount of resistance, — or by using an open channel or trough, half an inch to an inch wide, filled with water. The great facility of adjusting the distance between the wires on this plan is its recommendation. This channel may be made of any non-conducting insulating substance, — porcelain, plaster or painted wood. The conductivity of the water can easily be increased by adding salt.

When the helix is constructed so that the exterior coil slides over the interior or primary coil, we regulate the currents by sliding it. When the interior coil is entirely uncovered, we have the full force of the primary, with nothing of the secondary ; but as the outer coil, with its poles connected by a wire, slides over the inner, it gradually absorbs the force of the latter, until, when the inner coil is entirely covered, its whole force is absorbed by the exterior, which gives us a powerful Faradic or induction current and suppresses the primary current, for there is only a certain amount of force and whatever appears in one coil cannot appear in the other. Hence we may arrange it as we please, obtaining only primary or only secondary currents, or in any proportion we please ; for, when the inner coil is half covered by the outer, we have one-half the force in the primary current and one-half in the secondary, and we may administer these combinations of definite portions of each current to the patient, by having our wires or cords attached to the binding posts for each current. But if the poles of the exterior coil are not connected in any way it has no effect on the primary. It would seem that each electrode might have one wire or cord to carry both currents, — one electrode thus connecting with the positive primary and secondary, the other with the negative primary and secondary, — and that with this arrangement a skilful and experienced operator might produce very satisfactory results, with primary, secondary and combined currents in various proportions ; but when the student attempts to make this very convenient combination, he finds a difficulty not mentioned in any text-book. When the primary and secondary currents are brought together, with moderate cell power, they antagonize. The wires connecting the currents apparently into one bring them into conflict. The positive primary, instead of going to the subject, strikes back to

the positive secondary and destroys it, and the negative primary destroys the negative secondary, leaving the secondary entirely destroyed, although the outer coil is over the primary in the position to receive all its force. The primary current, by thus acting through the outer coil, destroys all inductive effects, and takes this route without touching the patient, who then feels nothing.

Hence it is necessary (to combine the currents with moderate cell powers) that they should go to the subject through separate wires and electrodes, without any metallic contact on the route, and both currents will then be realized, if the electrodes are prevented from touching; a strip of rubber or paper to keep them apart until delivered into the subject will prevent their mingling, for they will not react on each other through the subject, but each will produce its complete effect as if it were alone. With a doubled cell power the positive primary, in touching the positive secondary, suppresses it on that side and increases the negative secondary. So the negative primary, in touching the negative secondary, suppresses it and reinforces the positive secondary. In other words, each primary current repels the secondary of the same side, driving it to the opposite side, and the two primary currents suppress the two secondary by touching them, but if the primary and secondary are kept apart until they reach the patient, each has its full effect. It is curious to observe how the primary electrode on each side nullifies the effect of the secondary, even though the secondary coil entirely covers the primary, and how quickly a powerful Faradic current is then released on one side, whenever the primary ceases to touch the secondary electrode.

As batteries are commonly constructed, the first binding post gives the positive primary and the second the negative primary current. The second is also used to give the positive Faradic and the third the negative Faradic; but the first and third — in other words, the positive primary and negative secondary post — are used to give the combined current, which is the most powerful that can be given, and which is increased, like the Faradic current, by pushing the exterior over the inner coil, and diminished by withdrawing it.

When the two coils of the helix are not movable but fixed, we have a certain full amount of available force in each current, which we may reduce down to nothing, by the use of the sliding tubular shield, which reduces the entire force of both currents. Thus we may have any grade of intensity of either current, singly or combined, but we cannot vary the proportions of the two combinations as when the outer coil is movable, and if we combine the currents they combine on an equal footing.

Hence I prefer the movable coil, as giving a far greater variety of

desirable effects, and in preparing the coils I give the primary a much fuller development than usual, because I attach more importance to its use, and desire a more efficient magnet to operate the rheotome in slow or rapid vibrations, — the common helix being too feeble to control the rheotome with facility and sustain the desirable variations.

The standard apparatus, as proposed by the Electrical Congress at Paris in 1881, may serve as a standard *for comparison merely*, but I do not regard it as a satisfactory standard for an efficient induction apparatus. This proposed apparatus uses as a generator the Daniell's cell of one volt; the operator needs a cell or cells capable of giving more than one volt. The length of its primary coil is three and one-half inches; of the secondary coil, two and three-fifths inches. The primary wire is one twenty-fifth of an inch in diameter; the secondary, one hundredth. There are four layers of the primary wire and twenty-eight of the secondary. The primary current is thus hardly sufficient to generate the strength of magnetism necessary to give power at the rheotome, or to make a strong apparatus, the length of its wire being less than a hundred feet. The exterior coil gives a fine current, and contains about thirty times as great a length of wire as the interior coil.

As the exterior coil covers but a trifle over half the length of the interior coil, the helix can give primary and secondary currents at the same time, in nearly equal proportions, the primary strength being doubled when it is used alone. Such an arrangement is appropriate when the exterior coil is not movable.

ELECTRIC BATHS.

The principles governing electric baths are not obscure. If the bath-tub is metallic, the patient should be separated from it by a wooden floor or lattice-work, to avoid contact. A current applied to the bath-tub brings a diffused influence over the entire surface of the patient, which flows readily if the water be well supplied with salt, and at the same time conveys the peculiar tonic, antiseptic influence of salt, which is beneficial in fevers. An unlimited variety of medical impressions may be made by introducing the remedies in the bath, and applying the positive pole to the metallic bath-tub.

The negative pole may be held in the hand, out of the water, which will bring an abundant current to the arms. The tonic and cooling influence thus applied to the surface will be peculiarly beneficial in fever, and in cutaneous diseases of a relaxed and hyperæmic condition.

If a negative pole, well insulated, is applied to the shoulders, a highly tonic and restorative impression will be made.

In a bath-tub of soapstone, painted wood or japanned ware, glass

or porcelain, the treatment consists in applying electrodes (which are insulated by varnish or rubber up to the point of contact with the body) to all points of the surface, on the same principles as when out of the bath, which need not be described at present. Water being described as a poor conductor, the currents given in a bath should not be much influenced by its presence if not made saline. But in fact warm water offers less resistance than the surface of the body. If sufficiently saline, currents may be passed without actual contact which will tend to diffuse over the whole surface, which is an important feature of the saline bath. Positive currents may be diffused over large areas of the surface and attracted by the negative pole to the region of Health. This gives us the opportunity through the water of making a very extensive and diffusible electrode through water for either the positive or negative poles, and thus gives an important variety of treatment, in which very large electric currents may be passed through large areas without irritation. The liability to irritation will be still less when the current is from the magnetic battery. This transmission through water may be made when it is not salted, for in practice we do not find in water so great a resistance as we should expect from the statements in the books, and when salt or carbonate of soda is freely added the conductivity becomes much greater than that of the body, and currents may pass quite around the body for this reason, unless the electrodes are brought into contact with it.

For galvanic currents, about sixty cells, giving one and one-half volts each, are sufficient for electric baths. Some patients will require the whole force of the battery and others will be as much affected by one-tenth of its power. The best way of regulating the power is by a rheostat or current regulator, which gives to all the cells an equal action, rather than by selecting a certain number of cells, which taxes them unequally.

Galvanic and primary currents change the predominance of functions, but when we use a commutator their power is increased, and they manifest the stimulating power of the Faradic, and a strong current will produce an extensive contraction of muscles when sent through the length of the body. When electrodes are placed on the skin they make a strong impression, and when they are more remote the impression given through the water is of course more slight and diffused through a larger surface. The greater penetrating power of the Faradic enables it to be felt at a greater distance.

When the medicines are not too expensive they may be administered through the bath, in which case the positive current may be given from a metallic bath-tub, or from a naked wire extending all around

it under the water. Dr. Schweig, of New York, mentions his success in administering iron through the bath, which he used in the form of tartrate of iron and ammonia. He has also successfully used the extract of malt, and I have no doubt that nutritive substances may be effectively used when needed. Iodine he has found available in promoting absorption of morbid deposits, and iodide of potassium, one ounce to the bath, he found useful in removing lead from the system.

Influence of Static (Positive) Electricity.

It has been shown, in the chapter on Hygiene, that the higher regions of the atmosphere are more congenial to the brain and the higher elements of humanity and greatly promotive of the health of the lungs as well as the brain.

These higher regions are largely supplied with positive electricity, the accumulations of which we observe in thunder-clouds. The evaporation of water under almost all circumstances (and especially from the ocean) carries up a positive condition with the vapor, and of course leaves a more or less negative condition behind. Thus the surface of the earth, and the air in contact with it, is usually negative, except when dry and heated by sunshine; and apartments at or below the surface of the earth are very unfavorable to health, compared with those in the upper stories of houses, or in dry, elevated locations, where positive conditions prevail. The positive condition of the atmosphere in dry, sunshiny weather, with a clear blue sky, is extremely pleasant and healthful, while the negative conditions of damp weather, with deficient sunshine, or, still worse, the negative condition produced by thawing ice and snow in the slush of winter, or the east winds from Atlantic icebergs, are very depressing. It has been determined by careful observations that the electricity of the atmosphere reaches a maximum about 10 A. M., which is the period most favorable to human activity, and reaches a minimum after midnight, about 2 A. M., a time which is most appropriate for rest and entirely unfit for labor.

We thus learn that electricity, like caloric, is the natural stimulant of the nervous system, necessary to its activity; and it is continually generated, with caloric, in a healthy constitution, and so freely in some few individuals as to be given off in sparks. The natural condition of the human constitution in health and vigor is positive, but the positive electricity disappears when the nervous energies are reduced by over-exertion, fatigue and lassitude, or by rheumatism and some other diseases. This positive electricity, however, is not detected when it is carried off by perspiration.

Being thus a necessary stimulant of life, the diminution of which depresses all vital processes, we evidently have in Franklinism the most valuable agent furnished by electric science, incapable, unless violently administered in shocks, of the injurious effects that have often followed the use of chemical electricity, and capable, by its currents, of controlling physiological and pathological processes more satisfactorily and much more conveniently than it can be done by chemical electricity.

The true explanation of the value of static electricity, the close correspondence and sympathy of all corporeal and all cerebral surfaces, being unknown to the profession, they have been puzzled to account for its superior value. Dr. W. J. Morton says: "How can simple electrification by insulation and the drawing of sparks, it is asked, produce the decided effects that are claimed for it? Static electricity, it is said, owing to its high tension, accumulates merely on the surface of the body, and does not penetrate into the deeper organs, while the spark is merely the briefest kind of current."

This ignorance of the *rationale* may have been one of the causes for its signal neglect for a whole century, while *benevolent*, practical men, like Rev. John Wesley and Dr. Gale of New York, went on in triumphant cures. The same ignorance of the *rationale* of animal magnetism contributed to its neglect. Dogma is more important than facts to dogmatic minds.

Dr. R. J. Curtis, in the *American Medical Journal*, endeavors to explain the effects of electricity as due to its mechanical forces. Medical literature is emphatically "wandering in the dark" on this subject. The superficial notion expressed by a well-known writer that static electricity is a superficial affair, operating only on the skin, like baths and massage, is essentially untrue, for it penetrates the body in every direction as freely as it passes through water, and hence may act directly on the internal organs. Yet, even if it did not, SARCOGNOMY shows that in operating on the surface it affects every vital power. Hence it proves curative in many cases in which medical science has entirely failed and even galvanism is unsuccessful, for it produces effects that nothing else can produce. Dr. F. E. Caldwell mentions a case of muscular rheumatism of the deltoid muscle, in which galvanism entirely failed, which was cured by tri-weekly treatment with static electricity by insulation sparks and massage roller.

Static or Franklinic electricity, which for near an entire century was neglected or contemptuously treated by the majority of the medical profession, is still but imperfectly presented by medical authors and its great capacities but little understood.

Electrical machines are commonly supplied with brass chains or

cords, with some textile covering, as the channel for conveying electricity to patients, and long handles furnished to manipulate the chains and keep them off the patient and operator, as it is said that the "electricity readily leaps off the conducting cord in a shower of fine sparks." There is no excuse for this folly, as wires covered with rubber or gutta percha are perfectly insulated and require no handles to manage them, nor any precautions to prevent their losing electricity by touching the table or any other object, so that "the electricity may be all drawn off and the patient will receve none."

The exposed end of the covered wire is quite sufficient, when approximated to the patient, to give or receive that gentle, insensible current which produces a happy effect when it is applied for delicate treatment.

Handles of rubber or well-varnished wood, six or eight inches long, are sufficient to protect the operator, and any electrodes used with the common battery, metal, carbon or sponge, may be used, being held in contact with the person or clothing, or held near the surface for insensible passage of currents.

Gentle sparks may be drawn when a strong local impression is desired, but otherwise a gentle, barely perceptible current is the best, which is obtained by contact with the skin.

Whether treating by one or by two electrodes, the principles guiding application are the same as in the application of chemical electricity guided by Sarcognomy.

The method of treating by Franklinism, however, differs materially from that of the electricity originated by galvanism. With the four forms of electricity from galvanism, the operator has nothing to do but to use two electrodes, bringing them into contact with the body — the proper localities being shown by Sarcognomy. A current from the positive to the negative electrode through the intervening body is the whole story. Such is the common practice.

But in Franklinism we are not *obliged* to use two electrodes upon the patient. He may be fully charged with either a positive or a negative condition from one electrode, and then treated with the opposite electrode alone. But in the process of charging him with, say, positive electricity we do not ignore the negative electrode; we simply connect it in some way with the ground or floor.

ACTION OF STATIC MACHINE IN CURRENTS AND SHOCKS.

When the machine is arranged and operated as usual, the Leyden jars into which the brass rods are inserted become highly charged. The positive rod establishes a negative condition on the surface of the jar and the negative establishes a positive condition; thus the outside

of the jar is in a condition opposite to the inside, and the knobs connected therewith. So long as the brass rods and knobs are charged with positive electricity on one side and a negative condition on the other, the jars are compelled by induction to retain their electric conditions, and they cannot discharge or equalize themselves though connected by metal at the bottom ; but when the knobs of the rods are near enough to permit a spark or flash to pass, the moment it passes the electricity of the jar is freed from inductive restraint, and the positive electricity passes to the negative jar through their metallic connection, with the same force but in the opposite direction to the flash of the knobs. If, instead of the brass connection between the jars, the connection should be through wires held by the patient, the current would pass through him and give him a strong shock. If the knobs are less than an eighth of an inch apart, the rapid flow of sparks between them corresponds to the flow from the outsides of the jars, and if this is allowed to pass through a patient (who is in connection with the disconnected jars) it will give him vigorous shocks such as he would feel if the sparks touched him, which have some resemblance in feeling to a Faradic current. For my own comfort I would prefer to have the knobs not more than the sixteenth of an inch apart. Dr. Morton claims to call this a static induced current similar to the Faradic ; but this is purely fanciful. The Faradic is a to-and-fro current, but this is a one-way current like the primary, and it does not differ from a sparking current taken direct from the knobs, or the currents from the inside to the outside of a Leyden jar. It is simply a Leyden-jar current, kept up by a continued flow of electricity from the revolving plates.

When the jars are disconnected we can take the sparking current from them, and when they are connected we can take the same current from the knobs above, which communicate with their interior, by bringing an electrode near the patient, who holds the other. The current is just the same, differing only in duration and in the fact that one comes from the tinfoil and the other from the brass rods or knobs. It adds nothing to our resources, and Dr. Morton's pretended discovery of a static induced current, *with new properties*, is simply a misunderstanding of very plain facts.

We may take the static current with an even flow as insensible as the galvanic, by close contact with the sources or electrodes, or we may take it in an interrupted manner, so as to give delicate spark shocks or very violent ones. But the interrupted, shocking current is the same wherever we obtain it. We may obtain it from the knobs or from the jars. If the jars are separated and we connect ourselves to them, we get a shock for every spark passing between the knobs, for that compels a similar current between the jars.

If the knobs are separated widely and we connect with them, while the jars are but slightly separated, the spark will pass between the jars, and we get a corresponding current as a shock from the knobs. It matters not whether we take our shocking current from the knobs or the jars, but it is important that the spark should be small to make the shock delicate. Hence the interrupting space between the knobs or between the jars, where the spark passes, must be very small if we would escape a painful shock. We approximate the knobs very close when we take a shock from the jars, and we approximate the jars very close, by proper connections, when we take a shock from the knobs. An eighth of an inch is a gap wide enough to give strong shocks, and the thickness of a sheet of paper is a sufficient separation to produce a pleasant broken current. When either the upper (interior) or the lower (exterior) current is broken by a separation producing sparks, it causes a broken or shocking current in the other connection, which the patient will feel if the connection is through him.

We may get our shocking current in another way ; each rod charged with a positive or a negative condition has the opposite condition on the outside of its jar. Hence we may get a Leyden-jar current simultaneously on each jar between the jars and the knobs, and treat two patients at once with them. My new static apparatus is arranged to demonstrate and use these two currents at once, and also to combine them with magnetism.

But it is possible also to duplicate in another manner — to treat one patient with the current of the jars in shocking fashion and at the same time treat another with gentle shocks from the sparks of the knobs, if we arrange rightly, which would be duplicating the jar current which Dr. Morton thinks so important.

We could not, however, obtain the second shocking current direct from the knobs, as contact with them would cause a smooth flow. An interruption of the current would be necessary, which should be procured at the contact with the patient, as when the negative electrode is approached to the positively charged subject or when the fingers approximate the positive and negative knobs. But it is obtained direct from the knobs in my new apparatus.

Thus we understand the static machine may give two shocking currents simultaneously — either one from each jar in connection with its knob, or one from the jars and one from the knobs, and these shocking currents may be converted into smooth, continuous currents by firm contact. Thus two patients may be treated at once by either style of current, or with a machine of sufficient power several patients joining their hands may be treated as one.

The explanation of these things has been either neglected or unknown by the authors of our text-books, and machines have been constructed generally with the jars connected by brass and arranged with a view to one current only.

METHODS OF USING STATIC ELECTRICITY.

Treatment by static electricity is more simple than by other methods. Insulation and saturation is a leading measure. The patient is brought into connection with the positive or negative electrode (I prefer the positive), and the other electrode is used to complete the circuit, by holding it near enough to the body to procure a passage of the current.

Without making a current, however, we get the benefit of static electricity from one pole, in contact with which the patient becomes charged — his surface fully covered, and his hair more or less erected, if the charge be sufficient. To produce this result readily the patient should be insulated, to prevent the escape of the electricity and permit its accumulation. He may have his chair or stool placed on rubber cloth, or on a varnished wooden platform, resting on glass legs, and the conducting cord may be attached to the platform or may be held in his hand. The absurdity of using a brass chain or a cord wrapped with textile material, neither of which is capable of holding the electricity, seems to be still in fashion (I suppose for want of thought), and these conductors require a long handle to manipulate them and keep them off the patient. An insulated copper or steel wire is the proper conductor, which may be freely handled without the least escape of electricity. The steel wire admits of the convenience of an elastic extensible coil. Insulation is favored by a dry atmosphere and a dry skin in the subject. We should avoid having anything pointed about the patient or his seat, as points discharge electricity with greater freedom than flat surfaces. Silk and woollen clothing assist the insulation.

To insulate and charge the patient with positive electricity gives him a general stimulus, to promote the operations of life, as the entire surface of the body is under electric stimulation, and this produces by sympathy a general stimulation of the brain and exaltation of the vital powers, while it also stimulates the body directly, for we find on the surface of the body the corresponding seats of all the physiological and psychic powers, parallel with those of the brain. Such being the case, we naturally infer that universal superficial stimulation approximates the character of a PANACEA — a remedy of universal value. But its character as a panacea is not complete, because its action is superficial on brain and body.

What, then, shall we add to complete its power by acting on the interior structure of body and brain? Shall we use the galvanic or the Faradic current which penetrates deeply? This would indeed be a valuable combination — either to use the currents simultaneously, by uniting the wires in an electrode, or to use one after the other.

I would recommend the combination of static currents with either of the three dynamic currents, galvanic, primary and secondary, as the case may require, and I think I see in these combinations a new world of therapeutic utility. I refer not merely to insulation, but to the positive and negative currents of static electricity in combination with the three dynamic currents. I trust the medical profession will take this up, which I can only mention at present, and enjoy the benefit of these suggestions.

My attention, however, has been more especially given to the importance of providing an interior tonic element — an element to sustain organic life, which, added to the stimulating power of the static current, makes a complete vital development.

This tonic and soothing organic influence, which fortifies against the waste of high stimulation, I find in MAGNETISM, an element somewhat opposite to dynamic electricity — soothing instead of irritating, cooling rather than heating, and constructive instead of destructive. Magnetism and heat are antagonistic. Magnetism is entirely destroyed in a magnet at the temperature of 770 degrees, as stated in the French Academy.

Its influence corresponds with that of the tonic and conservative region of the brain, above and behind the ears, while the influence of dynamic electricity is almost entirely basilar.

By combining magnetism with static electricity, I propose to fortify as well as stimulate; and by combining it with dynamic electricity, I propose to give the latter a more soothing and wholesome influence, greatly increasing its hygienic power and the tolerance of the constitution for its use.

THE STATIC CURRENTS. — From each pole of the static machine a wire and a proper electrode give us a current which we may use in the same manner as the positive and negative electrodes of dynamic electricity, with this difference, that static electrodes do not require to touch the skin, but may be applied all over the body by holding one or more inches from the surface, or in contact with the clothing.

If the electrodes are in contact with the skin, the currents pass almost insensibly, as from galvanism. If the patient is holding the positive electrode, the negative being approached to his person and presented as a point or small surface, it will draw a current from the part which it approaches, giving a slight and pleasant sensation;

but if the electrode be not pointed, it may draw a spark, whenever the electro-motive force is sufficient. Fine sparks drawn by contact with the clothing are not objectionable, but a spark of any length makes a sharper impression than is desirable.

By this method we may give a stimulating impression to any or every region of the body, with a better effect than by the negative pole of galvanic or primary currents. With an adequate knowledge of Sarcognomy and the laws of therapautic treatment we have a simple and satisfactory method in the use of the static negative pole.

When I see how charmingly all the faculties of the sensitive constitution, including all the powers of the brain, respond to this treatment, I am ready to place it in the very front rank of therapeutic agencies.

It is not indispensable that the electrode, which acts as a negative, should be connected to the negative pole of the machine, for if the patient is well charged his electricity will pass off to conductors which are not really negative. One electrode may be connected to the earth, and the most convenient method is to fasten it to the iron gas or water pipes — and even without such a connection the hand of the operator may withdraw a spark, when the patient is well charged.

Dynamic electricity can sustain the action of two poles when not directly connected to each other, by connecting with the earth, through which they communicate as readily as if connected by a wire — a fact difficult to explain. But static electricity has so much more energetic diffusiveness that not even an earth connection is necessary; the connection occurs through almost any surroundings.

P. S. — In reviewing this chapter, I would refer again to the marked difference between the measurable galvanism and the dynamism of induction which has not been measured, but which is realized in its effects on the human constitution. I have suggested the union of this dynamism by a coil with galvanic currents, as producing a more pleasant and efficient continuous current, which I hope to introduce into general use. In urging its adoption I have admitted (through courtesy) the common theory that the multiplication of cells produces only an increase of electro-motive force, and no increase of galvanism; but I must now state my individual opinion that an increased number of cells increases the volume of galvanism, as well as the electro-motive force, and that the gain of electro-motive force in using a coil is essentially different from the gain by multiplication of cells, and is for therapeutic purposes preferable — in other words, coil dynamism and galvanism are essentially distinct, and the physiological energy of coil dynamism has not been subjected to mechanical measurement.

As to the efficiency of batteries or currents, some of my remarks might mislead the reader, unless he bears in mind that the efficiency of batteries or currents depends more on their connection with the body than their magnitude. A metallic electrode plate six inches square, with a saturated solution of salt or muriate of ammonia on the skin, will be a hundred times as efficient as a small electrode with merely a moist connection, and will therefore make a small battery efficient. It is especially important that the negative electrode should be large.

CHAPTER XXV.

ELECTRO-THERAPEUTICS GUIDED BY SARCOGNOMY.

Electric currents and batteries — TREATMENT OF HEAD and nervous system, directions of authors — Paralysis — Cerebral disorders and their treatment — Chorea and spasm — Neuralgia — Treatment of eyes — Diphtheria — Toothache — Hydrophobia — TREATMENT OF THORAX — Pneumonia — Asphyxia — Consumption — Pleurisy — Diseases of the heart — Aneurism — The diaphragm — Hiccough — TREATMENT OF THE ABDOMINAL REGION — Fevers — The stomach — Nausea and vomiting — Cholera — Constipation and hernia — Dropsy — Rectal diseases — The liver — Electric development — TREATMENT OF PELVIC ORGANS — amenorrhœa, dysmenorrhœa, menorrhagia and parturition — Hemorrhoids — Stricture of the urethra — Impotence and spermatorrhœa — Diseases of the skin — Treatment of limbs — Use of apparatus — Batteries — Static apparatus — Electro-puncture — Cauterization.

THE object of this chapter will be to present in a condensed form the methods of treating diseases generally by electric agencies. The pathological record may not be complete, but the methods presented will probably be sufficient to guide the reader in the treatment of any other forms of disease.

Before presenting the special treatments of organs, a few remarks are necessary to give clear ideas of currents and resistances in the human body, which are usually left in a vague condition in the mind of the student. This question refers entirely to galvanism, for static and electro-magnetic currents are not subject to milliampere measurement.

The cursory and inaccurate remarks of the last chapter were based upon the ordinary incidents of electric application, in which everything depends upon the mode of application of the currents. A dry skin may make a resistance of 100,000 or 150,000 ohms, reducing the current of a powerful battery to insignificance, while a moist connection with a saline solution may reduce it to one or two thousand ohms. Whether accidental contact with electric light or motor wires in the line of their connection shall be dangerous or not, depends much on the condition of the skin. The resistance of 17,000 ohms which I found between the hand and foot was obtained with the common wet connection through the best apparatus of Sir W. Thompson, but in an experiment with metal electrodes, the hand and foot well wet with muriate of ammonia solution, the resistance indicated was but 6,000 ohms. With metal electrodes, a current from foot to foot,

moist, indicated a resistance of 22,500 ohms, but when thoroughly soaked only 9,000, and with muriate of ammonia solution instead of water 4,800. With the same solution a current from summit of thigh to foot indicated but 2,621 ohms, and from hand to foot but 3,375.

Water is necessary to soften the skin and permit the entrance of a current, but is not itself a good conductor. Indeed, pure water has been pronounced a non-conductor, but the water in common use has enough saline matter and impurities to make it a conductor, especially such as comes from the water-works of Boston, and the saline materials always present on the skin give a degree of conductivity. The resistance between the left foot and right hand, wet, I found equal to that of six inches of Boston water. A single inch of Boston water made as much resistance as appeared in a current between the foot and summit of thigh, well wet with muriate of ammonia.

In administering currents we should keep a saturated solution of salt or muriate of ammonia to use in making them effective, and pure water and sponges to moderate their action. The estimate that one galvanic cell would be required for every inch of the circuit in the body, to make an effective current, is applicable only to the common, imperfect connections. When we use saturated saline solutions the entire length from hand to foot may be estimated as offering a resistance of not more than 75 ohms to the inch, through which an efficient battery would send twenty milliamperes — much too large a current for ordinary practice; hence one cell for every two inches of current would be ample, with saline connections, and forty cells would send a very efficient current from hand to foot, while twenty cells would be quite sufficient in ordinary practice. Larger batteries, however, are used, with a rheostat or current regulator, so that the full power of the battery is never used, and consequently it is always in order and more durable.

But I do not admit the necessity of these large batteries for the general practitioner, when a few cells reinforced by a coil will produce as atisfactory current of combined galvanic and electro-motive force, — the latter giving the penetrative power, which is sufficient to affect all parts of the body. This power, though not measurable by the metre, can be appreciated readily by its vital influence.

TREATMENT OF THE HEAD AND NERVOUS SYSTEM.

The treatment of the brain by electricity is necessarily a sort of *terra incognita*, and authors have but little to say on the subject, as experience has shown that in applying galvanic currents to the head it is sometimes greatly disturbed, leaving feelings of oppression, dulness, faintness, mental confusion, nausea, vomiting, convulsions and

paralysis. Warned by this experience they avoid heroic treatment and proceed cautiously with one or two cells gradually increased.

One of the most respectable works (Haynes) gives the present state of knowledge on this subject as follows: "There are several ways in which electrization of the brain may be performed. 1. Place one pole on the forehead and the other on the back of the head (occiput). 2. Place one pole over each temple. 3. Place one pole behind each ear (on mastoid process). 4. One very large electrode on the top of the head and another at the feet, in the hands, along the spine or under the chin. 5. To electrize one-half of the brain, place one pole on the eyebrows and the other on the mastoid process or in the hand of the same side. Less dizziness is caused when the current passes through one side of the head only, or from the forehead to the occiput, than when sent from one side to the other through the temples or mastoid processes."

This is a very meagre statement to one who knows that by proper currents through the head we may stimulate in detail every psychic faculty and every physiological power. But let us review it: Currents from the forehead to the occiput produce a great variety of tonic and stimulant effects — more healthful and harmonious as we approach the upper region, more hard and forcible as we descend.

"One pole over each temple" is an objectionable proceeding with galvanic currents, but legitimate with Faradic or alternating treatment.

The galvanic current should not be applied to the brain without understanding its organology and realizing what we are stimulating and what we are suppressing. The Faradic and alternating currents applied symmetrically on the right and left sides, or anteroposteriorly on correlative organs (as when we combine the lower occiput (*gyrus angularis*) with the perceptive organs of the brow), give a proper normal stimulus if *the currents are sufficiently gentle*, which generally requires an effective rheostat. The static is the proper current for the head, with or without contact.

To "place one pole behind each ear on the mastoid process," of the Faradic or static current, gives a general stimulation of the vital forces and muscular energies. The galvanic would be improper, unless regulated by commutation.

"The large electrode on the top of the head," if negative, may stimulate the brain — if positive, may relieve its congested and heated conditions by a downward current. But it is seldom that a positive pole on the top of the head is allowable, for it would not require long to depress our most sanative energies. Hyperæmia may be better relieved with the positive pole at the base of the brain, especially the under-jaw region, to send a downward current. The current to the

hands may relieve an oppressed brain — to the feet, it would be still more effective, if not carried too far. Applying the negative pole under the chin would be heating — under the jaw, exciting and disturbing. That is a location for the positive instead of the negative pole.

The current from the brow to the mastoid process is stimulating to the physical forces, but not so beneficial as when directed to the upper part of the occiput.

The directions of authors as to cerebral treatment are vague and chaotic, from their entire ignorance of local functions, and it is unnecessary to review them; but I would mention that the dispersive power of galvanism applied to the base of the brain has been successfully used to remove morbid conditions by Althaus of London and by Hughes of St. Louis.

The profession has not entirely succeeded in ignoring the excitement of the cerebral organs in man by electricity. *One solitary fact has been reported.* It is stated by Haynes as follows: "Helmholtz made a real advance in electro-physiology. He observed that the *descending* current (the positive electrode on the forehead and the negative held in the hand) produces not only irritation, but alteration of excitability, external objects becoming less distinct. The effect of the *ascending* current (the positive electrode in the hand and the negative to the forehead) is to render objects more distinct." This is a distinct discovery of the stimulation and suppression of the intellectual organs by negative and positive currents applied to them; but, plain as the facts are, the medical man forgets that there are organs in the brain, and ascribes it all to the ascending and descending direction of the currents. Scientists are not always sufficiently vigilant to perceive phenomena for which they are not looking.

A careful diagnosis should precede electric treatment. When the operator is not guided by Psychometry he should use electricity for exploration. The negative pole of a Faradic current should have its electrode fastened on the operator's wrist, while he goes over the entire person, pressing his finger upon every part to be explored. The patient may hold the positive pole in his hand or upon the hypochondria, or it may follow the negative, so as to send a current in a short course through the part to be explored, as the impression is stronger the nearer the electrodes approach. Every part in an inflammatory or actively morbid and sensitive state will show by pain or sensitiveness that it is not normal, but parts in a very torpid, inactive state will show less than the normal sensibility. As we can penetrate and reach all parts of the body in this way, it leads to a correct diagnosis.

In cases of paralysis we wish to learn if it belongs to the brain or to the spine and nerves. If the brain is the seat, it will probably appear as hemiplegia, being conspicuous only on one side, and the muscles of that side will be as excitable as ever by electricity — sometimes more so. If it be seated in the spine, also, muscular irritablity will continue; but if in the nerves, there will be a great loss of excitability to Faradism, while the muscles may respond actively to the galvanic current and our prognosis will be more favorable. In such cases a few months are generally required for recovery, but of course there are some speedy cures.

In treating over the body it is convenient to compare any spot on one side with the corresponding spot on the other side. All changes in sensibility and contractility are important. When the swelled or congested condition has a basis of inflammation there is great tenderness to the current. When it is the stagnant result of former disease, as in a congested spleen, there is great dulness or but little feeling. A similar condition may exist in the liver.

When the spine is sensitive, the effect of its irritations is felt at a distance, and a metalic taste may be produced by the current, which is not usual when the part is below the head.

Faradic electricity furnishes the best diagnosis of death. Rosenthal reports the apparent death of a woman, pronounced dead by a country doctor, and lying in that condition, pulseless, for thirty-two hours, in whom he found the muscles of the face and limbs to respond to the Faradic current, and recommended resuscitation, which was successful in twelve hours. She was, though motionless, capable of hearing the talk of those around her. Some contractility survives death, but it rapidly declines, never lasting longer than two or three hours. It persists longer in well-nourished bodies, and in those dying of acute disease, than in those exhausted by chronic diseases.

Cerebral disorders are generally associated with the predominant influence of a position on the back of the neck (at the upper cervical vertebræ) related to the basis of the brain, and corresponding with the sacrum, feet and legs. Consequently a current from that locality to the middle of the shoulder is restorative in almost every case. If there are hyperæmia and heat in the head a current to below the knee would be proper. The most soothing current in such a case is to the tibial region and top of the foot.

If the brain be in a dull, depressed, inactive condition, the proper current should be directed to the part of the temporal arch marked Sanity and Cheerfulness, and extending through Health to the location of Power on the median line (posterior end of Firmness), any

portion of which tract will produce a renovating, invigorating effect. The positive in this case may be held in the hand, but it is better to apply it to the hypochondria or the groin, or, in cases of extreme dulness, to the foot.

Very gentle currents by broad carbon or sponge electrodes or the point of a static electrode, from the front of the head to the upper occpiut, are generally beneficial, especially from the locations marked Disease and Insanity — also from the space in front of the upper half of the ear, which is analogous to the under-jaw region.

With dynamic electricity, the scalp should be exposed as much as possible and the surface wet; with static electricity, contact is not necessary, with a strong current. With a weak current (introduced by the positive as before) the negative may be applied upon the organs; with a stronger current it may be held over the organs we would excite, and as the hair rises to meet it we are assured the current is passing. It is not desirable to draw sparks from the head or any sensitive locality. The steady, silent current is the most wholesome, and is best developed by an electrode with numerous fine points like a hairbrush, or by contact with the skin.

The treatment of the head by static electricity may be made a very important adjunct to ethical culture, and education generally. It is beautiful to observe how the finer sentiments are developed and cultivated in the sensitive by the static negative pole held over the head.

Next to the static I would recommend the galvanic current for the head, but that requires much greater caution in its use. One to five cells would be sufficient for its treatment, but each case must be a law for itself. Two cells are as much to the very sensitive as twenty to the insensible. In speaking of galvanic cells I refer to those containing muriate of ammonia. The sulphuric acid and bichromate cells are not commendable for head treatment.

Insane and hysterical conditions require a gentle current from the under-jaw region to the shoulder and axilla, or to the region of Sanity. In hysteria, the current may be from the chin and below it to the spot just behind and below Sanity, and on the body from the region of the womb and groin to the axilla, and also to the lumbo-sacral region, for its tonic effect.

Insanity of all grades requires the establishment of health in the pelvic organs, which sometimes requires orificial surgery.

The insane condition requires currents from the base of the pelvis — perineum and sacrum — to the axilla and shoulder. Hence the patient should sit on the positive electrode, a large sponge, which should be charged with the remedies appropriate to the case. Of

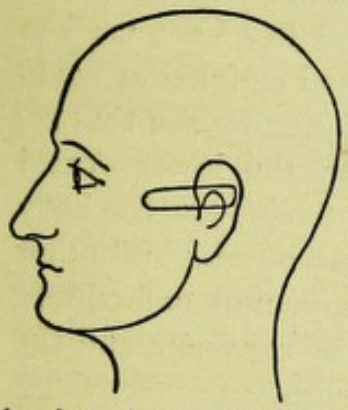
course chronic cases require very prolonged treatment. A carbon electrode wrapped in moist cotton would also be appropriate. When the brain is lacking in vigor from the deficiency of spirit and animal force, currents may be passed from the side of the face to all parts of the occiput, as well as from the front of the body to the shoulders and thighs and entire posterior half of the body.

In all unsound conditions of the brain great attention should be paid to restoring everything in the pelvic region, and also in the region of the liver and hypochondria, which has a coinciding relation with the pelvic organs, and is tributary to unsoundness by the gloomy, fretful and irritable character which it produces when irritated.

This unsound tendency, belonging to the hepatic zone of the body, locates also in the anterior part of the third or basilar temporal convolution, and its external development is above and around the cavity of the ear. The antagonism of this is in Firmness and Patience.

Sound mental conditions are promoted by gentle currents to the superior posterior quarter of the head.

In inflammation of the brain we may proceed as in other local inflammations, with the dispersive power of the positive pole, passing currents to the feet and legs to give the brain absolute repose and relieve its congestion. These currents, as a general rule, should be from the anterior and basilar regions rather than the superior and posterior, but of course should be applied to the seat of inflammation. But, as the influences below the knee (subhuman) would tend to lower very greatly the normal condition and sustaining power of the brain, they should give way, as soon as the active inflammation is subdued, to the more tonic influences on the body at the locations of Repose, Coolness, Sanity and Health, — influences which promote soundness of brain and develop its recuperative power.



The currents applied to the brain in this case will of course be greatly aided by combining with the proper medicine at the positive electrode, and by combining with the nervaura of the operator in passing through his person. This of course requires a stronger current, and it is modified to great gentleness in passing through the person. To balance this obstruction, the negative electrode, which may be a foot-plate, should present considerable obstruction in the way of wet cloth, sponges, or water ; the feet being in a tub of water. The negative influence will penetrate too far unless its obstruction equals the positive.

We must not, however, confound with inflammation of the brain

the wild excitability of delirium tremens, in which the cerebral circulation is weak, especially in its upper posterior region, and a current to the tonic region (from Sanity to Power inclusive) will be soothing and healthful. The currents in this case should be from the forehead, face, temples and under-jaw region, upward and backward, toward Patience, Tranquillity and Repose.

Similar currents should be applied on the body, from the perineum, groin and hypochondria, upward.

In this disease the morbid irritability of the nervous system is due to a lack of the soothing influence of rich blood; for nervous irritability increases as nourishment declines, and the globulous and albuminous materials of the blood are diminished. It is essentially due to a failure of the digestive organs, as well as to the exhaustion of the energies of the brain by the mischievous over-stimulation of alcohol. Hence it is important to give the brain the restorative influence of sleep, and equally or more important to restore the digestive process by treatment of the stomach. This has been proved by the success of large doses of capsicum, which has been used in doses of twenty grains, repeated if necessary, with immediate curative effects, due to the stimulation of the alimentary canal. Chloral has been used to procure sleep more successfully than morphine, and sulfonal or cochineal would answer the same purpose well. Hence we see that reciprocal currents (preferably galvanic) between the lower dorsal region and the regions of Assimilation and Alimentiveness on the body would be appropriate, followed by the liberal use of milk and other easily digested food, aided by the best pepsin compounds to facilitate digestion, not forgetting the stimulant power of capsicum and the gastric influence of alnus rubra with a little angelica.

Alternating currents between Assimilation and Repose would be specially appropriate, and currents from the hypochondria to Health.

There are many fanciful, misguided, unpractical people who need invigorating currents from the temples and cheeks to the occiput. Under the influence of the occipital organs they would take different views of life.

There are many whose languid and inefficient life requires the stimulation of the upper occiput, and many indeed whose morally cold and selfish nature requires a strong stimulation of the whole upper surface of the brain by static or galvanic electricity repeated daily for months, which would improve their health and longevity as well as their virtues. The new condition should be maintained by treatment until it becomes constitutional. These principles, I trust, will be amply illustrated hereafter in hospitals and reformatory institutions.

Great improvement of brain conditions and consequent elevation and

prolongation of life may be produced by static electricity, accummulated on the surface, which increases the vitality of the brain ; and when this is combined, according to my new method, with mineral magnetism, it becomes one of the most powerful sanative agencies known.

In the treatment of the brain, a gentle application of the negative pole, with very mild primary or galvanic currents, is a measure of immense value in the hands of a master of science. Still more valuable is the negative pole of static electricity, from its genial character and general safety. To rouse the brain to strong, healthy action is the best thing we can do for a patient, and this is to be done by a negative pole somewhat restricted in its access, for when the positive pole is applied to the body and the negative pole has free access to the head, the entire head may fall under a too decidedly negative influence, which should be quickly discontinued.

The negative treatment of the upper occipital region of the brain and the upper posterior region of the body are very beneficial measures. How much mischief might be done by too negative and too prolonged a treatment I cannot say, as I have always been cautious.

The positive pole applied to the head and the negative on the front of the body is not a safe measure, though it has been cried up under the name of central galvanization. Dr. Pitzer describes its effects correctly when he says : " If it does no good it is likely to do harm. It lessens the quantity of blood in the brain, and if used too strong or continued too long dizziness is experienced, and if still further continued the patient becomes unconscious and falls from the chair in a condition of syncope, and vigorous efforts, with the application of stimulants, may be required to bring about a reaction." " With the greatest care and the use of the rheostat some patients cannot bear central galvanization long at a time. We observe the face growing pale, and the patient sighs a time or two, or expresses feelings of weakness or depression, and we are forced to desist. One or two minutes is as long as we can use it in such cases ; in others it will be well borne for ten or fifteen minutes." This indicates that they have strong constitutions — no sensitive constitution could bear it well. This description shows just what Sarcognomy indicates. The method was very unsuccessful in the hands of Althaus.

All treatments applied exclusively to the front of the body and face are objectionable ; and the use of the negative pole in front requires to be guarded with caution.

It is true that a gentle and brief positive influence on the brain may be beneficial when it is in a state of over-excitement and vascular relaxation, but it should not be by a downward current to the stomach.

The currents most beneficial will be from the forehead and face to the occiput; to the upper occiput generally, but to the lower occiput and base of cerebellum when we wish to stimulate the physical powers, and from the under-jaw region to the upper occiput to strengthen the nervous system. A great deal of good may be done by these posterior superior currents. But if currents are to be sent to the stomach, it is better to send them from the under-jaw region or from the lower part of the neck, before or behind, than from the upper surface of the brain, — a region which should never be under depressing influences.

On the other hand, it is not improper to apply the positive pole to the head, for the same reason that we might apply it to the spine, to relieve local irritation or hyperæmia. Hence there are cases in which, with caution, it would do good. One who understands the brain would realize the locality of a local excitement, needing the positive pole.

Dr. Pitzer speaks of relieving cases of an obscure nature, with nervous distress, melancholy or wakefulness, by central galvanization. He would have been more successful by using upward and backward currents, from the forehead, the side of the face and the under-jaw region, toward the upper occiput, and a vigorous treatment across the shoulders or between the epigastrium and spine.

I would not object in all cases to a moderate current to the epigastrium, which would promote the action of the stomach, but such a current should not be from the top of the head. It would be much better from the lower dorsal region.

The treatment of the brain in insanity by electricity is of course in a perfectly chaotic state in the medical profession, and must be so until its functions are understood. About half a century of medical experience has established nothing. Dr. Arndt of Griefswald thinks it of very great value. Williams in England and Bryce in Alabama speak favorably of it. Arndt recommends general Faradization, Beard and Rockwell central galvanization; but the whole business is crudely empirical, — a mere fumbling in the dark.

Let me state finally a few obvious principles derived from Sarcognomy.

1. Insanity being a derangement owing to the predominance of the under-jaw region of insanity and essential deficiency in the upper posterior region, especially on the temporal arch, vertically above the ear, currents to the upper posterior region are evidently appropriate, while currents from the under-jaw region to the back of shoulder and axilla are equally proper.

2. As insanity may assume either the arterial form of high excitement or the venous form of idiocy and dementia, the latter will require

stimulation of the upper posterior cerebral circulation by the negative pole, while the former will require the sedative tonic action of the positive pole, specially directed to the regions of hyperæmia, the location of which may be understood from the phenomena, by those who understand the brain, and may also be inferred from the local heat.

3. In the mixed cases of mania, neither decidedly arterial nor venous, the healthy action of the brain being impaired, we need invigoration by the negative pole of the upper posterior region, and especially of that marked Sanity, as well as a general invigoration of the brain by the positive static electric, both on the insulated stool and by static currents from the sponge or plate on which the patient sits to the upper regions of the brain — especially the upper posterior. To this must be added special positive or negative treatment of the various organs as their condition requires.

4. The law of sympathy between brain and body requires a careful removal of all derangements in the pelvic and hepatic regions, improvement of general health, and concentration of power to the shoulder and axilla.

MELANCHOLY is a condition bordering on insanity and tending to suicide in persons who are in all other respects sound, and who believe themselves acting as rationally in surrendering a life which yields no pleasure as if they should die to escape intolerable pain. It is due to a failure in the upper posterior region of the brain, including Cheerfulness and Health, leaving Melancholy (which we reach through the angle of the jaw) in predominance. Of course it requires gentle currents in the brain from Melancholy to Cheerfulness and Health, and in the body from Melancholy above the groin to Cheerfulness in the axilla. The relief of mental depression in this way by the hands is one of my most familiar experiments. A few days ago I was called to the wife of a physician, in whom it was quite apparent that the basis of her trouble was mental depression, making her voice extremely feeble. Before administering any remedies I relieved her with the hands upon the region of Cheerfulness and Energy, making her conscious of the relief, which was expressed in her more cheerful voice.

I earnestly hope that these suggestions may fall into the hands of physicians capable and willing to carry them out faithfully. But it is only a small minority of mankind who are sufficiently exempt from the control of habit to enter with facility into a new course of thought and investigation.

The application of currents to the base of the brain is the most unsafe method of cerebral treatment. I have mentioned (page 485) the injurious effects on man. In some experiments on animals at the

Central Park, New York (1890), with a galvanic battery, a savage baboon was subjected to galvanization, successively raised to forty cells, from a sponge in his mouth to one of his paws, when it was at length overcome, and "became lethargic and almost comatose, acting very much like a man overcome with drink." After being released it became furious and attacked its keeper. The dog subjected to a current through the base of the brain "began to act queerly a few minutes after the experiments, and within half an hour showed symptoms so like those of hydrophobia that the keepers killed him."

This result shows that hydrophobia, which is located in the base of the brain, might be successfully treated by the rational application of electricity.

PARALYSIS is a condition in which the circulation and nerve power of the affected nerves and muscles must be roused. The negative pole of the galvanic current is therefore the one thing needful. When the circulation and life have been restored Faradism is appropriate. At first the negative pole is our reliance, then we may use the alternate current, and finally the Faradic.

In infantile paralysis, a result of fever affecting the spinal cord, prolonged and gentle galvanization, according to Dr. G. B. Massey, is indispensable. Faradization is entirely wrong. The mistake of using Faradization where galvanism is the proper remedy is very common, and the mistake of using strong currents for a short time when mild currents for a longer time would be better is also very common.

When the brain is involved, gentle static currents directed to the superior and posterior regions will be of incalculable value, if it be due to softening or other impairment of the brain. Two daily treatments by that method will have a happy effect — the positive pole being applied between the thighs, which is the best location for cerebral treatment, or upon the abdomen at Melancholy and Relaxation. I am very confident that static electricity, guided by Sarcognomy and associated with the magnet, will have a grand career in the treatment of the brain, not only in paralysis and insanity, but in many inferior conditions of the brain which would not be called disease.

When paralysis is due to cerebral hemorrhage, a gentle static or galvanic current applied to the lower part of the affected hemisphere through the hand of the operator, and sent to the first dorsal vertebra, centre of the scapula, or any part of the shoulder, will be beneficial. If there is much excitability of the brain or danger of renewed hemorrhage (which the positive current would check) the current might be sent to the top of the foot, or to the region of Repose, on the trunk.

Paralysis from the lower part of the spinal cord may appear as paraplegia, disease of the lower part of the body including the bladder and rectum. There is a complicated form of paralysis in which limbs on one side or the other and portions of the face are affected, which may involve the brain, its nerves or the spinal cord, and the diagnosis is difficult. Electrical excitability is sometimes greatly increased by irritation or inflammation in the nervous system, and it is not difficult to discover its source. Inflammations of the gray matter of the cord produce a great variety of effects which may be traced by electricity to the inflamed portion. The inability of muscles to respond to galvanism indicates impairment of their structure, and if far advanced the cure is hopeless.

The peculiar value of the galvanic current in paralysis is due to the fact that it operates upon the muscles themselves rather than the nerves. Hence in paralysis we generally find the Faradic, which is a current for the nerves, of but little value, while the galvanic makes a very strong impression. The action of the nervous system is marvellously quick and that of the muscles comparatively slow; hence the sudden and rapid alternations of Faradism stimulate it, while the slower galvanic current becomes insensible and acts upon the motor nerves only by its interruptions, its effect being increased by the rapidity of the interruptions. When the nerves fail, the galvanic current makes a stronger impression on the muscles than in the normal state; thus it seems *a substitute* for the nervous system, while Faradism is a nerve stimulant, and the two may be very advantageously combined. Thus the combination of primary and secondary currents introduces a small galvanic element from the cell which is beneficial; but this galvanic element is more conspicuous when the primary current is used alone and when it is originated by two or more cells.

The galvanic current is of a lower grade than the Faradic and static, and therefore appropriate to lower conditions — to the conditions in which the nervous system is of a low grade or greatly impaired — and it is generated in abundance only in fishes such as the electric eel. On the other hand the static, with its high electro-motive force, contrasts with the slow and feeble galvanic, and is especially the current of the nervous system, — *the only current well adapted to the brain.*

CHOREA AND SPASM. — Chorea has been successfully treated by Dr. Pitzer with galvanism — applying large sponge electrodes (with from two to eight cells) above the ear on the side of the head opposite the affection, the negative pole being in the hand of the affected side. From three to six minutes of daily application was sufficient.

This treatment would reduce excitement and irritation in the brain, and if the current were carried to the feet it would be equally bene-

ficial. But two to eight cells would not send a current of any force to the feet. In the above case the current was from one-half to two milliamperes, which shows how delicate a galvanic current is appropriate, especially about the brain. A fraction of a milliampere is sufficient in any delicate constitution. Generally I would recommend an upward current on the limbs affected; the negative electrode being placed on the summit of the shoulder at the location of Patience, on the centre of the scapula (Health), or on the first dorsal vertebra. If the restlessness is very great, the negative may be applied under the arm two inches below the centre of the axilla, or two inches further forward (Tranquillity). The quieting influences of Scutellaria, Leonurus and Xanthium are appropriate.

Either of the forms of electricity may be used, but the static is upon the whole preferable.

The treatment of chorea by sparks from the spine was very successful with Dr. G. Bird and Mr. Addison at Guy's Hospital. The cures were generally speedy, even in the worst cases. The sparks and current were beneficial, but shocks objectionable.

Dr. Dewees (in the *New York Journal of Medicine*) says: "In the most frightful case of tonic spasm from utero-spinal causes the continued current has in my hands proved a perfect charm. The interrupted current (in this case) proved highly injurious, causing convulsive actions, while by the simple galvanic current the spasms would be immediately broken."

The continuous galvanic, being a one-way current, is truly valuable in dispersing irritability by the positive pole. The same power belongs to the continuous static current. The magnetic combination adds greatly to its soothing power.

NEURALGIA finds its best relief in electricity. Galvanism has been successful in the worst possible cases. In rheumatism, Dr. F. T. Payne of Texas reports that he has found, in every case of chronic rheumatism or neuralgia, "a dead or insensible nerve at or near the painful spot," which does not feel the electric current. He says that a steel electrode pressed along the course of the impaired nerve is curative. "The first sensations produced by a concentrated current are pleasant, then warmer on to burning, until the instrument must be removed on account of the intensity of heat or burning sensation; and the pain is banished at once, and the limb or joint is ready to move in any or all natural directions."

In cases not inflammatory the Faradic current gives speedy relief. A French physician, Dr. Duval, tells of being confined to bed by a severe sciatica of the right leg, which was cured by a single Faradization.

The Faradic current is especially adapted to impaired nervous action ; hence it relieves the excessive perspiration of the hands or feet, and general Faradization is appropriate to excessive perspiration.

To produce relief by the Faradic current in neuralgia and rheumatism, the coil should be of a great length of very fine wire, and the interruption very frequent.

Neuralgia is one of the most obstinate affections with which the electrician has to deal. Its therapeutics can be successfully managed only by adhering to clear general principles.

The electric current carries with it the vital conditions of the parts through which it passes ; consequently, when, for example, we have a descending galvanic current through the sciatic nerve, by placing one electrode behind the head of the femur and the other at the foot, a gentle current, *not strong enough to produce any irritation*, gradually removes the irritation or pain. The positive electrode should be placed high enough, in any case, to include the whole morbid tract.

Another method which has been neglected by electricians is to pass currents through the affected nerve at right angles to its course, as when we pass currents through the sciatic nerve from the outside to the inside of the thigh, carrying the electrodes downward from the origin of the nerve to its termination. In all cases the currents should be of that degree of gentleness which is not disturbing, for strong currents are followed by a reaction, in which the excitability and hyperæsthesia are increased and the result is injurious.

The inverse or ascending current is also often beneficial ; but as this current simply carried to the spine might leave an abnormal excitability at the spot in the spinal cord, it is better to place the negative on the region of Health, making the first application a few inches from the positive, and convey it along the spine and up to the Health locality or to the dorsal summit of the cord.

Much delicacy is required in the treatment of neuralgia, especially when the electrodes are near together, and the use of large sponges or carbon electrodes will enable us to make our applications delicate. I would especially commend the carbon electrodes as excellent channels for soothing applications.

While the foregoing is the general treatment of neuralgia, there are numerous cases in which there is an asthenic condition and a greater toleration for electricity, — cases in which an energetic stimulation is beneficial, and Faradic currents through the affected nerves and their spinal origins will be the best treatment. But in using the Faradic currents we should begin with the feeblest, guarding the patient by electrodes that mitigate the force, and gradually increasing the current in proportion to toleration.

One who understands the carrying power of electricity will never neglect in neuralgia to combine the electric current with the proper anodynes, which may be contained in the sponge or cotton electrode or a strip of cloth laid on the suffering part. Cocaine, theine, hyoscyamus, belladonna, cannabis, morphine, svapnia, tonga, piscidia, chloroform, ether, menthol and salicylate of sodium. He will give, thus, relief to the affected spot without disturbing the rest of the constitution and without requiring the hypodermic syringe. There may be a slight absorption if the remedy is applied on the skin, but when we wish to avoid this, as in treating the eyes or any part on which we do not wish to leave a medical stain, a medical electrode makes it possible to convey the medical potency.

THE EYES are often marvellously relieved by electricity. Dr. F. T. Payne of Comanche, Texas, reports the case of a clergyman who was blind, having lost his right eye, and the left being in a high state of inflammation so that he "could scarcely discover anything but a mass resembling coagulum filling the orbit." He had been sleepless and suffering intensely, but thirty minutes' treatment gave great relief, and after the third treatment he slept soundly and dismissed his guide. The Faradic was used, and was also concentrated upon a spot which seemed deficient in sensibility, with good effects.

In the case of another clergyman, P. W. Graves, with chronic sore eyes, granulated lids and ulcerated cornea, quite blind, the positive Faradic current was applied to the eye through an eye-cup of water, — an excellent method,—which gave great relief, although at first he did not feel it. The inflammation was rapidly dispersed without the aid of medicine.

The great efficiency of electricity was illustrated in a case treated by Dr. Tipton of Topeka. Mr. G. presented a very severe case ; the destruction of the under part of the lids commenced in three days from the attack, which, "by the fifth day sloughed off. The destruction of the cornea commenced, with increased pain and inflammation day and night, so that he could not rest a moment. He stated that he could only compare the corrosiveness of the disease to a consuming fire. On the afternoon of the eighth day of attack he was conducted to my office, blind and distracted with pain. Within an hour from the time I commenced treating him with electricity he went away from my office seeing, and was free from pain." His case was cured within three weeks, his eyes being in perfect condition.

Dr. R. J. Curtis reports the cure of a case of amaurosis by a galvanic current from five or six cells — the positive pole being applied over the eye, and the negative over the mastoid process, moderated by a rheostat, but producing an appearance of faint flashes. The treatment was continued six months.

This treatment was not improper, but a better treatment would have been by very gentle Faradic or alternating galvanic currents between the eye and the *gyrus angularis*, which is at the junction of Adhesiveness and Combativeness.

Opacity of the cornea was successfully treated by Dr. C. Usiglio of Corfu, in a woman of thirty-five, seated in the right eye. Six cells increased to sixty were employed, the positive pole on the eyelid, the negative on the tongue. The strong current was intermitted occasionally, the conjunctiva became reddened and tears flowed. The cure was completed in a month. Dr. Channing mentions a cure by drawing static electricity from the affected eye.

Opacities of the eyes, in the vitreous body, generally yield to a positive galvanic current. M. Teulon claims to have cured twenty-two out of twenty-four cases by this method, and Von Graefe even claimed the galvanic cure of cataract. One to four cells are sufficient for this galvanic treatment.

I have avoided general practice, but in November, 1890, I was induced to undertake a case of congenital cataract and blindness, almost complete in one eye, in which I expect to effect a cure by statico-magnetic and nervauric treatment.

All morbid growths yield to electrolysis, in which the negative pole is applied. Granulations of the conjunctiva have been successfully removed by European physicians. We have reports from Drs. Schivardi, Arcola and Kohn, — the cures being made in a few applications.

The use of acupuncture of the eye for cataract has sometimes been successful and sometimes entirely failed, so that it could not be recommended.

The rules for treatment of the eyes do not differ materially from those for the treatment of other delicate organs. Positive currents, to disperse inflammation and congestion, may be applied by static electricity, or primary or secondary or galvanic, if they are combined with magnetism or conducted through water. The negative pole is appropriate in amaurotic and enfeebled conditions. I expect more from the static-magnetic than from any other form. Dispersive positive currents assist the eyes when inflamed and sensitive, by application below and behind the eye, at the cheekbone and just above the zygoma.

The lower part of the occiput (junction of Adhesiveness and Combativeness) is the region that reinforces and sustains the eyes. This is the "*gyrus angularis*," upon which Ferrier supposes vision to depend. To stimulate this region by the negative pole is important in all affections of the eyes.

There are probably many chronic cases in which galvanism is the most efficient treatment. Dr. E. C. Mann reports the entire cure of a case of blindness in a girl, caused by meningitis, which oculists had pronounced incurable. He administered the galvanic current "several times a day, at first for a few moments each time." Vision began to develop in eight weeks and was completely restored in six months. Other treatment was used for her health, but the galvanic current cured the blindness. He recommends long-continued treatment with very gentle currents, and very judiciously adds: "There are also chronic congestive states of the brain, which tend to mental disorder if not checked, where, in my opinion, we have in the constant current of electricity the very best therapeutical means of cure."

I would add that the eye is very sensitive to nervauric impressions, and that good magnetic healers sometimes relieve cases in which all other treatment has failed. Dr. MacGeary, now of London, has made some remarkable cures in this way.

The eye may be conveniently treated with a sponge impregnated with water or medicinal solutions. An effective application is a glass or wooden eye-cup for electric treatment, which may contain medicated solutions on sponges, with a conducting wire in its stem. I would recommend the use of the new Pyoktanin in all severe affections of the eyes. It is a wonderful remedy for local application.

Treatment of Ears. — Deafness has often been cured by currents through the ears, carefully applied, though it has often failed.

Dr. Fenella of Italy succeeded by applying the galvanic positive pole to the ear and the negative to the tongue. He reported four successful cases. The application should be made every other day. Jobert de Lamballe cured several by galvanic currents between the Eustachian tube and ear.

Ringing in the ears was cured by Dr. Hoering by currents in the ear given twenty-two times. Dr. Wright of London reported a number of cases. The treatment is strictly local and according to general principles — negative for dull, inactive conditions, positive for irritations and tendency to inflammation. When suppuration exists, either in the ear or elsewhere, pyoktanin and peroxide of hydrogen are the best remedies.

There is such a thing as "hysterical deafness," a nervous condition which is promptly dispelled by electric treatment.

Diphtheria. — Electricity combined with local treatment is entirely reliable in diphtheria. Dr. G. K. Smith, who has been quite successful, uses it as follows. His method is so good that I quote his whole description.

"I place the feet of patient in water as hot as can be borne with

comfort, and put in that water one, two, or three spoonfuls of saleratus. Then take a glass of cold water and put some saleratus in it, and with this solution wet the electrode which is to be applied to the throat. The negative pole of the battery is put into the bath in which the feet are placed. The positive is to be covered with cotton and used in the throat, on the tongue, and in the nose if needed. The sponge handles or ordinary electrodes cannot be used in these localities; but a very convenient one for the mouth and throat is made by covering the blade of a dinner knife with a thin layer of cotton, soaked with the solution of saleratus. The cotton also serves to keep the soft parts of mouth and throat from direct contact with the metal, which otherwise would cause pain. Mouth should be kept open, so that teeth will not touch the electrode. A convenient electrode for the nose is made by winding a thin layer of cotton on a wire. Thus prepared, the patient is seated in a chair, if able to sit up. Feet are placed in the bath, and patient holds in his lap a basin to catch the saliva as it flows or as he has occasion to spit it out. The physician should not sit in front for fear the patient will cough and blow his poisonous secretions in his face. Sitting near the right side, he dips the electrode into the saleratus water to wet the cotton; then placing it on the tongue, he holds the knife by its metallic handle in the left hand, while he lays the right hand very gently on the sponge of the positive electrode. The current will now pass through the operator, and he can regulate the power of the current to the ability of the patient to bear it without pain. If he wants a stronger current he can grasp the sponge a little tighter. As soon as patient becomes accustomed to the current on the tongue, the operator may pass the electrode gently up to the side of either tonsil. Watching a good opportunity, he can now pass it back to the posterior wall of the pharynx, and even down to the epiglottis. This last position is likely to make the patient cough, and in some instances vomit. In either case mucus in large quantities will be thrown out, and it will become necessary to remove the electrode; but before this is done the current should be broken by raising the right hand from the sponge electrode. The cotton on the electrode should be secured by winding a little thread around it, and the operator should be careful not to let the electrode touch the teeth, as that will cause pain. If the current passing through the operator be too weak, he may bring the positive sponge up and touch the handle of the knife. Electrode must be removed occasionally, to give patient a chance to breathe, etc. Not necessary to use a strong current. Electrode for the nose can often be passed back as far as posterior wall of pharynx.

"Was called to see a gentleman who was suffering very much.

Had very intense thirst, throat so swollen he could scarcely talk; suggested electricity in the throat; and in a few minutes' time after its use, the man, who was powerful before he was taken sick, said: 'I feel almost as strong as I ever did.'

"The current should be just strong enough to be comfortable, and so that it will not make the patient fear it. Can use it with children, and have done so with marked effect for good."

The use of saleratus is very proper to control inflammation and promote secretion. Passing the current through the operator adds greatly to its value. There are many diphtheria remedies which might be used on the electrode. Sulpho-calcine, the latest, is unquestionably valuable. Pinus Canadensis has long maintained its reputation. Orchis mascula, a remedy very little known, is regarded by Dr. E. H. Holbrook of Baltimore as superior to all other remedies. Turpentine in substance and in vapor, vinegar, carbolic acid, muriatic acid, subsulphate of iron, baptisia, trypsin, nitrate of sanguinaria, muriate of iron, muriate of pilocarpine and hyposulphite of soda have all great value. The latter is considered a preventive.

APHONIA was cured by Dr. Torrance (*London Lancet*) by Faradization of the vocal chords after all medical treatment had failed. The patient, a woman, lost her voice after having an ulcerated sore throat, and the loss had continued after the throat was healed. The voice was thoroughly restored.

The Faradic is certainly appropriate, and may be assisted by the local application of Jaborandi. The alternated galvanic, primary or static would be equally proper. Currents between the larynx and the fossa below the occipital knob would be better than if confined to the larynx.

TOOTHACHE has been relieved both by galvanism and Franklinism. Generally the positive current relieves in five or ten minutes. When there is much swelling or inflammation the negative pole has been used, as it produces the alkaline condition, which is antiphlogistic and solvent. The Faradic current has also been used with success, as it gives tone to the bloodvessels of the affected part; and in the extraction of teeth it has been used by attaching one pole to the forceps, the other being held by the patient. This may modify the pain and also check the hemorrhage. The latter object would be promoted by the positive galvanic current. Relief is sometimes given by applying a plate of silver and another of zinc against the base of the affected tooth.

HYDROPHOBIA is a disease of inflammatory irritation in the central base of the brain. It therefore requires a sedative, anti-inflammatory treatment and free circulation by the skin and kidneys to assist in the removal of a morbific element.

The most powerful sedative, and one which is reported to have been successful in many cases, is the Xanthium Spinosum. Over sixty years ago many cures were reported by the use of Scutellaria (skull-cap), which is not only a pleasant sedative, but a tonic to the spinal cord. Inula helenium (elecampane) has cured many cases undoubtedly hydrophobic, which was due not only to its impression on the nervous system, but to its power of promoting the secretions. The vapor bath is also reported to have been successfully used, and its success would justify the use, for its diaphoretic effect, of Jaborandi, which is said to have proved successful against snake bites.

The elecampane was used by boiling an ounce of the root in a pint of milk boiled to half a pint, the dose being taken in the morning, on an empty stomach, and no other food taken till late in the day.

The electric treatment appropriate would be by currents from the base of the brain to the feet — also from the knee and the lower end of the spine to the summit of the chest and region of Patience.

TREATMENT OF AFFECTIONS OF THE THORAX.

Pneumonia. — Channing says: "The testimony is universal as to the bad consequences attending the use of electricity in this disease; at any rate in the active stages of inflammation," — which simply shows a great lack of proper knowledge. Dr. Wilson Philip also said that, "in ordinary cases of phthisis, nothing could be more improper than the use of galvanism." We cannot thus speak of galvanism as of a dose of medicine, for it is an agent of great variety of powers. We might as well speak of surgery as the application of a knife. American practitioners of the liberal school have not hesitated to use electric currents in both pneumonia and consumption, and Dr. Beard mentions the wonderful cures of consumption claimed by Dr. Bastings, but considers them incredible. There are some reports of favorable effects from galvanism, but the profession seems to have shrunk from the treatment of pneumonia by electricity.

The most powerful, prompt and efficient treatment for pneumonia is by the pneumatic method, for which I refer to the chapter on that subject.

Whether we use the galvanic, primary or static, the current should be from the entire length of the sternum, the hypochondria and the lateral base of the chest, to the tibial region and the whole leg and foot; also to the regions of Health and Repose. The downward current should be the first, and continued long enough to produce a sedative effect, after which the posterior currents would be appropriate.

We know that positive currents of electricity are powerfully tonic, acting upon the vasomotor nerves, contracting the bloodvessels, and thus overcoming the essential characteristic of inflammation by removing the congestion and enabling the bloodvessels to resist it. In doing this their influence is cooling, hence they fulfil the requirements of pneumonia entirely, except that they are not sufficiently anodyne and expectorant. These qualities should be supplied by medicine. I would therefore administer an electric current qualified with hyoscyamus and directed to the whole region below the knee. This will relieve the congestion, and subdue the inflammation in a pleasant manner.

If the inflammation be high or advanced, veratrum viride will powerfully aid in subduing it. Arnica is also an efficient contra-stimulant, lowering the rapidity of the pulse. A moist atmosphere, maintained by boiling water in the room, will be very beneficial, and any soothing agent in the boiling water, such as balsam of Peru or drosera and sugar, will improve its effect. Dextroquinine has a beneficial influence, but the faculty attach rather too much importance to quinine. Declat's syrup of phenic acid is upon the whole rather better. But of all the febrifuges in pneumonia I know of none equal to *Gnaphalium polycephalum* (life everlasting is its common name). It is a most admirable tonic for the lungs, and I think should be our leading remedy. Sanguinaria is an admirable expectorant in small doses, with extensive influence on the skin, kidneys and liver. Its expectorant quality is much aided by squills. Penthorum is very similar to drosera as a soothing expectorant, and tussilago, by its soothing, healing action, makes an excellent aid to gnaphalium. The following proportions will make an admirable remedy in pneumonia generally, but might be varied to suit the peculiarities of each case: Gnaphalium, 10; tussilago, 5; hyoscyamus, 3; sanguinaria, 1; veratrum, 1; Declat's syrup of phenic acid, 5 to 10; liquorice or syrup, 20 to 50.

Veratrum and phenic acid might be increased as the condition is more feverish, and hyoscyamus as its soothing influence is needed. Demulcents such as flaxseed and althea make a valuable addition, and Crawley or Jaborandi may be added if the skin is dry. The reader will understand that in speaking of remedies I generally refer to fluid extracts.

If the apparatus of hæmospasia is not within reach, ligatures on the thighs, with the legs in warm water, should be an indispensable adjunct of the treatment. To preserve the warmth of the lower limbs is of the highest importance in curing and in preventing pulmonic attacks.

Asphyxia from drowning or poisoning requires vigorous and prolonged treatment. As the restoration of breathing is the object after drowning, it may be mechanically accomplished, while the patient reclines at an angle of 45 degrees, by pressing the chest and abdomen firmly to expel the air, then suddenly releasing the abdomen and lifting the shoulders with the hands at the axillæ — continuing this as long as necessary, keeping the patient warm.

The Faradic current from the back of the neck to three inches below the umbilicus (Respiration) will stimulate deep breathing. A current at the phrenic zone, from side to side (on the level of the seventh or eighth rib), will also stimulate the diaphragm. A current between the upper dorsal vertebra and the lower end of the thigh, or the region of Vital Force, will have great power in sustaining life and restoring respiration. Where narcotic poisoning is the cause, treatment may be directed to the stomach and lower dorsal region. In all cases a current between the shoulders on the location of Health is proper. In a young lady whose case was reported by Dr. Williams in the *Lancet*, narcotism from the effects of laudanum was promptly relieved by "electro-magnetic shocks" across the shoulders.

Direct action on the diaphragm has been successful in cases of drowning. In the experiments of Leroy D'Etoiles drowned animals were restored by electric currents sent into the diaphragm through long needles between the eighth and ninth ribs.

This method was successfully applied by Dr. Ferguson of Westmeath Dispensary to a drowned man after the failure of other efforts. The current of a fifty-cell battery was applied directly to the diaphragm by cutting down to it, and the diaphragm was at once put into action, resulting in recovery.

Dr. J. J. Caldwell of Baltimore relieved a negro boy, drowned in the dock for half an hour and apparently dead, by applying a Faradic current several hours.

Dr. Russell of King's College Hospital reports the relief of an infant of two months, supposed dead from the effects of laudanum, by electro-magnetic shocks from the back of the neck to the sternum. These roused and appeared to restore it, but it died from exhaustion a few hours later. If the shocks had been directed to the thighs instead of the sternum it would probably have survived.

Dr. Barry treated an infant of nine months, narcotized by thirty drops of laudanum seven hours previously and in a state of profound coma, with electro-magnetism, which had to be kept up four hours and three-quarters before it was securely restored.

A three weeks' infant, poisoned by Godfrey's Cordial five hours

previously and apparently dying, was restored in ten minutes by Mr. Tubbs, with shocks through the spine and cardiac region, as reported in the *Medical Gazette.*

A young man of 22, apparently dying from the effects of a dose of cubebs and opium, was relieved by Dr. Thos. S. Page, after a great variety of strong measures (including castigation) had been tried in vain, by giving him a shock from left to right through the heart, which restored consciousness and made him feel as if a gun had been fired off in him.

Mr. Corp of Middlesex Hospital reported the case of a man "who had taken an ounce and a half of laudanum six hours previously, whom vigorous measures, aided by flagellation with thin splints and wet towels, could not relieve, but who was quickly restored by electro-magnetism and shocks from the Leyden jar.

A woman who had swallowed an ounce of laudanum was brought into the Middlesex Hospital, an hour after, unconscious. In half an hour vomiting and general reaction was produced by the battery, and in an hour she was quite lively, but needed further application to prevent a relapse, as stated in the *Lancet.*

In these cases the nervous system is so insensible as to require the most powerful electric treatment greatly prolonged.

In a case reported by Prof. W. H. Pancoast the battery was used *fourteen hours,* and saved the life of a patient who had taken one hundred and twenty grains of chloral and eight grains of morphia.

Dr. J. J. Caldwell of Baltimore applied the Faradic current successfully, *four hours* after the usual remedies had failed, to a patient at the Maryland Inebriate Asylum, who had attempted suicide by opium. In the case of a child suffering from a poisonous dose of laudanum twelve hours previously, and not relieved by medical treatment, a powerful current for three hours restored her. The current was applied with the negative pole over the epigastrium and the positive to the pneumogastric nerve adjacent to the sterno-cleido muscle in the neck.

That currents on this route — that is, along the course of the pneumogastric nerve — are efficient in sustaining the functions of the lungs and stomach was shown by the experiments of Dr. Wilson Philip on rabbits and dogs. The action of both lungs and stomach failed fatally after section of the pneumogastric nerve, but was fully sustained when a galvanic current was used, digestion and respiration being well maintained.

I do not believe, however, that such currents are as efficient as if sent to the hypogastric region, three inches below the umbilicus, which excites deep respiration. The results are too feeble and slow. Dr. J. V.

Hennessey (in *Albany Medical Annals*) treated a case of poisoning in a woman by a grain and a quarter of morphine given hypodermically, and although atropine and brandy were given hypodermically it required thirteen hours of treatment to restore her. It was seven hours before she became conscious of it. It required *twelve hours* to relieve morphine poisoning in a child of two and a half years, although atropine was administered and coffee given by rectal injection. In this case the electrode was applied to the epigastrium at the beginning of the inspiration and removed at the end of it. I am quite sure the hypogastric application would have given speedier relief.

ASTHMA was successfully treated by Dr. Wilson Philip with currents from the nape of the neck to the epigastrium or lower, from eight to sixteen cells, passing the current through thin metal plates to avoid concentration. If the current had been passed to the hypogastric region it would have been much better, or if passed between the sides of the chest (Inspiration). The current also benefited a cough, but was injurious in cases of inflammation. The current would not have been injurious but beneficial if passed from the chest to the feet. The relief given by galvanism in cases which defied medicine was prompt, — generally in a few minutes, — as reported by Philip and by Pascalis. Even emphysematous conditions may be relieved.

The beneficial effect of galvanism on the lungs was shown by Dr. Philip in apoplexy, who "states that the respiration in sanguineous apoplexy is interrupted more by accumulation of phlegm than by the lessened action of the muscles of inspiration, the secretion assuming its character and remaining adherent on account of the withdrawal of the nervous energy from the lungs — a conclusion amply established by his experiments in the division of the eighth pair of nerves. This accumulation is often the cause of death." On passing the battery current through the lungs in this condition, Wilson Philip says: "After the rattling breathing had come on, and the patient seemed about to be suffocated, he was, at least a dozen times, made to breathe with ease, the accumulation of phlegm gradually disappearing on the application of galvanism, by which his life was evidently prolonged." The beneficial effect, I think, was simply the relief of congestion.

Asthma, as an affection of respiration, must depend on the respiratory tract of the brain as well as the lungs. Hence it is sometimes necessary to treat the brain on its respiratory tract, and also the respiratory tract on the body, around the umbilicus. The respiratory tract of the brain, which I locate in the Pons Varolii, has its exterior manifestation around the nose and mouth, through which we reach it.

Any disease in this region affects respiration. Hence catarrh, and the morbid growths it produces in the posterior passages, may become a cause of asthma as well as of bronchitis and consumption. In such cases interior treatment of the nasal passages by electricity (and, if necessary, electrolysis) may become necessary. A large sponge electrode on the nostrils and mouth, with the other electrode on the shoulder, would be a good application. Respiration should also be stimulated on the entire respiratory tract around the umbilicus.

The effect of stimulating the respiratory tract of the brain through the mouth is illustrated by the experience of Onimus and Legros, who found the best restorative from asphyxia to be a current from the rectum to the mouth. This is explained by Sarcognomy. The same benefit would be obtained by a Faradic current between the mouth and the respiratory tract on the abdomen. I do not know, however, that the location would be any better than the middle cervical region, where we strike the origin of the phrenic nerves.

The most direct and proper treatment in asthma is by a Faradic or an alternating current on the chest between the right and left sides, through the location marked Inspiration, just in front of the upper part of the humerus. The current or the hand applied on this part produces a full upward respiration, with a very calm, pleasant feeling, overcoming the feeling of constriction in the lungs. Stimulating respiration by the location below the umbilicus or on the face just above the chin greatly increases the depth of respiration, with an arousing effect. The other pole may be applied on the dorsal summit or on the centre of Health. It would also be a good combination to treat upon Inspiration on one side and Health on the other, treating both sides of the body successively. Some asthmatic remedy — such as grindelia robusta, for example — should be associated with the positive electrode.

PHTHISIS PULMONALIS, or consumption, which is mainly a tuberculous disease, admits of successful treatment by electricity, to appreciate which we must understand its nature. The researches of Andral and Majendie, too little studied by medical authors, show that an abundance of the red elements of the blood — the globules or corpuscles, as they are called — is the indispensable condition of good health, which gives activity to all our powers. The decline of this element marks the decline of vital power and the easy entrance of disease. A proper development of the red elements is incompatible with diseases generally, and especially with consumption, as they vitalize the normal structures and promote the speedy destruction or removal of abnormal elements.

Normal blood depends for its development and maintenance chiefly upon the upper half of the brain and the regions of Health and Vital Force in the body. Hence, with an adequate development and activity of these regions, consumption is an impossibility, as they secure ample respiration, digestion and activity of the secretions which purify.

A defective development or defective exercise of these functions predisposes to consumption, impoverishing the blood by lack of digestion and vitalization. Degenerate blood deposits tuberculous material, which in time develops suppuration and a variety of morbid conditions in the lungs.

To vitalize the lungs by alternating currents between Inspiration and the upper dorsal region of the cord, and from Health to Health on the shoulders, is the first indication. Then alternate currents between Health and Vital Force, followed by active exercise, will improve the constitution ; and similar currents between the lower dorsal region and the abdominal surfaces will increase the power of the digestive organs, which is indispensable to recovery. Large losses in the lungs by tubercle and suppuration may be recovered from if the digestive power is capable of yielding the material for a good supply of blood, to accelerate which we require a good supply of the most nourishing food and liquids. Animal food gives the richest supply, and carnivorous animals are free from tuberculous diseases. The practice of Dr. Salisbury in feeding his patients from two to five or six pounds of beef daily seems to have had good results. Fat meats, cod-liver oil and hydrolein are used with good effects ; and the mineral elements of nutrition — iron and the phosphates — are also valuable.

I did not propose in this work to lay down a course of medical treatment for diseases, but in speaking of electric treatment I cannot resist the temptation to make a few suggestions as to remedies which may be used in connection with electricity, or may be used to medicate the electric currents. Everything that enriches the blood is valuable. Tonics and alteratives are largely useful. Common salt and muriate of ammonia are anti-tuberculous and promote nutrition and health. Iodide of potassium or sodium in small quantities promotes the removal of all crude or unwholesome elements and benefits the lungs. Alnus rubra (tag alder) assists the action of the stomach, promotes all the secretions, and has a beneficial action on the skin which tends to relieve the lungs. The iodo-bromide of calcium has an excellent alterative quality, like the tag alder, and is rather more soothing.

When the condition of the lungs is irritated, feverish or inflammatory, gnaphalium polycephalum is the most reliable remedy, and may be greatly aided by the soothing, healing qualities of tussilago. De-

clat's syrup of nascent phenic acid is a febrifuge which has a fine effect on the lungs, and Paraguay tea (ilex) has a fine effect on coughs, bronchial irritations, sore throat and neuralgia. Balsam of Peru has valuable soothing, healing properties.

Drosera is very beneficial to irritated lungs. Piscidia and Hyoscyamus are soothing nervines, and Cundurango has a very comfortable influence on the constitution.

Bronchial irritations are benefited by Inula helenium, Sanguinaria, Yerba Santa, Collinsonia, Coptis (goldthread) and Quebracho, — the latter chiefly as a nervine stimulant.

Cannabis Indica and Ergot have strengthening effects on the lungs. Constitutional stimulants may be found in Eryngium aquaticum, Horse-chestnut and Nitrate of Ammonia. For the general development of the blood and vital forces we may use Buchu, Buckeye, Red and white clover blossoms, Triosteum and Gillenia. Alnus, Angelica, Celery seed, Dandelion flowers, Lettuce (Lactuca elongata) and Scrophularia are invaluable for the stomach, — the latter two soothing and relieving its morbid conditions.

For the night-sweats of consumption there is nothing better than Cinquefoil (five-finger), the influence of which is very wholesome. As tonics we shall find Ptelea, Hydrastis and Prunus Virginiana (wild cherry) valuable, —Ptelea being the most valuable for consumptives.

The liver may be relieved by Iris versicolor, Polymnia, Grindelia squarrosa, Gentian and Gentiana quinqueflora, or by the mild action of Dandelion and Hepatica.

Many of these suggestions are based on my own investigations and original. If time permits I may hereafter review the materia medica and present my discoveries.

In the treatment of consumption its hectic conditions may be relieved by the febrifuge treatment (Coolness, Repose and Health), and in some cases it may be necessary to stimulate the tibial region to tranquillize morbid conditions in the lungs. Perhaps the two most important functions to stimulate are Health and Vital Force. The adjacent organ of Nutrition is also important, to overcome emaciation, and should never be neglected.

Bronchitis affects the portion of the lungs corresponding to the intellectual organs, and therefore has a sympathetic symptom in pain in the forehead. The bronchial region is congested, inflamed and tending to ulceration, and this inflammation extends more or less into the lungs, and may extend up as far as the larynx. The irritation develops a cough, and severe disease in this region is very exhausting to the vital forces, especially in influenza or *grippe*, and tends to produce

much oppression of the brain. It is generally associated with fever, and requires febrifuge treatment. As there is a secondary heat centre in the brain, distinct from the chief centre, the medulla oblongata, and located between the eye and ear, there is a corresponding heat centre in the chest, below the mammæ, which develops a feverish condition in affections of the lungs and heart, which also generally accompanies bronchitis.

This disease requires the positive current to be applied over the whole extent of the sternum, and the negative to the summit and back of the shoulder, extending down upon Coolness and the entire space from that to the spine, thus making tonic and cooling currents. A similar effect to this is produced by quinine, the influence of which on the brain antagonizes the frontal and stimulates the lateral occipital region. Hence it has been a favorite remedy in pulmonary irritations, notwithstanding its objectionable effects, which make it inferior to Gnaphalium and the syrup of Phenic acid.

Currents to the tibial region and hæmospasia will exert a decisive influence on bronchitis, as on pneumonia.

The soothing influences of Hyoscyamus, Paregoric, Tonga, Bromidia, Paraguay tea, Hops, Poppy heads, Balsam of Peru, etc., will co-operate with Gnaphalium and syrup of Phenic acid, Sanguinaria, Drosera and Penthorum.

Static insulation, which acts on the surface, will relieve the lungs, and is beneficial in all pulmonary affections. Jaborandi and Crawley are valuable to open the skin, and the former is especially valuable, as it has a decided effect on the larynx and bronchi, somewhat like Sanguinaria. Ptelea is a valuable tonic for the bronchial patient, and Saw Palmetto, recently introduced, is an efficient restorative.

Remedies applied on the chest in a warm poultice of althea or althea and hops have a good effect, which is increased by passing the electric current through them.

As chronic bronchitis, like irritations of the frontal brain, tends to great exhaustion, it needs tonics and a generous diet, almost as much as consumption. Animal food and a little ale or porter may be necessary, and a general tonic treatment on Health, Vital Force and Nutrition, as well as on the upper half of the dorsal region.

Sarcognomy shows a relation between respiration and the abdominal region. Hence the lungs are materially relieved in bronchitis and pneumonia by the action of the bowels produced by electricity or by gentle cathartics, such as Juglans, Celandine, Rhamnus frangula (which is very mild), or Iris, Gentiana, Bryonia, Cascara and Phosphate of Soda.

Nauseant remedies divert from the lungs and relieve their conges-

tion, for nausea is connected with the pelvic region, and may be excited by the current from the front of the chest to the sacroiliac symphisis, or by emetics, of which a decoction of lobelia and boneset (Eupatorium perfoliatum) in equal parts is one of the best.

In PLEURISY the location of the disease would indicate, according to Sarcognomy, more pain and irritation than in bronchitis and consumption, but not so much as in some diseases of the lower half of the body; also an interference with pulmonary respiration requiring abdominal breathing, a tendency to affect the brain in an exciting way, and a development of fever. It tends to extend to the lungs and develop a cough. But it is not a dangerous disease if it does not lead to extensive effusion or suppuration.

In all inflammations common-sense and experience direct us to divert the congestion from the inflamed part. This is easily done by cupping over the inflamed pleura and by hæmospasia upon the arms and lower limbs. To these promptly efficient measures the positive current is an important adjunct, giving tone to the relaxed blood-vessels and diverting both blood and serous effusion. The current should be sent to the arms and lower limbs, especially the tibial region and the region of Health and upper dorsal spine.

Cathartics and diuretics, as well as moderate diaphoretics, are beneficial in all inflammatory affections of the chest. Hot poultices of hops and althea or elm upon the pleuritic trouble are very beneficial; and warm water alone, in the form of a wet pack of maintained warmth, is beneficial in all inflammatory affections of the chest. The benefits of all external applications are increased by sending the electric current through them.

When much serous effusion has occurred we may rely upon static and Faradic currents to disperse it, with the aid of diuretics, of which Galium, Polytrichum and Hypericum are the best, which may be aided by Jaborandi, to act on the skin.

In DISEASES OF THE HEART, pericarditis, endocarditis, hypertrophy and angina pectoris we need currents from the heart to the shoulder and upper dorsal region, reinforced by Convallaria, Cereus and Evening Primrose (Œnothera biennis). The latter I have discovered to be especially valuable in organic diseases of the heart and its valves; it is very sedative, soothing, and almost soporific, with a fine influence on the bronchial and nasal region, larynx and throat. The Convallaria (lily of the valley) I think preferable to Digitalis as a tonic for the heart, having like Digitalis also a diuretic action. Cereus (grandiflora) is a tonic sedative to the heart and brain — a genial, anti-inflammatory remedy. The Cereus Bonplandii may not be equal to the grandiflora, but has in addition a decided action on the spleen.

In the dilated condition of the heart, which is a condition of weakness, manifested by the diffusion of cardiac sounds through the chest, the Convallaria would be good, and the Strophanthus might be used in small doses, which is not so soothing, but is a stimulating tonic to the heart. General tonics, such as Coca, Ptelea, Saw Palmetto and Syrupus roborans, would materially assist, in connection with a nourishing diet.

ANEURISMS have been treated by inserting needles partly insulated, through which a strong galvanic current produced a coagulum of the blood, which gives some relief and may sometimes cure.

THE DIAPHRAGM — Erroneous ideas of the diaphragm are quite common. For example: "It is stated by Dr. Golding Bird that the charge of a Leyden jar transmitted from the pit of the stomach to the back causes the diaphragm to contract violently, expelling the air from the lungs with a loud shout." This is reversing the action of the diaphragm. The expulsive action and shout are due to the abdominal muscles, the diaphragm being an inspiratory muscle.

The treatment of the diaphragm has been explained under the head of asphyxia. The phrenic nerve coming from the middle cervical region and being nearly reached on the middle of the neck, while the corporeal location for deep respiration is three or four inches below the umbilicus, it follows that Faradic or alternating currents between these locations are the proper method of producing deep respiration. But as the diaphragm itself may be reached by transverse currents through the trunk at the seventh and eighth ribs on the side, that method also is efficient. We may also stimulate respiration by currents between the cervical region and the lower end of the thigh behind the knee, or even in front, above the patella.

HICCOUGH is commonly referred to the diaphragm, but is chiefly an affection of the abdominal muscles, and should therefore be treated on the lower dorsal region of the spine. The sedative influence of the region of Patience would assist in its treatment, and nervines such as Scutellaria, Leonurus and Xanthium would assist.

TREATMENT OF THE ABDOMINAL REGION.

The abdomen is the battle-ground or seat of fever, which is continuous in proportion as the location of the disease approaches the region of Calorification.

When the vital power of the spinal region is sufficient to regulate abdominal action, we have proper assimilation and excretion, which produce sustained health. When that spinal power fails, disorders ensue, of which fever is a conspicuous portion. Hence, treatment of

the spine by manipulation and cupping has often been successful in fevers.

Electricity has great power over febrile conditions, for they tend to increase impressibility; but the medical profession has failed as yet to realize its value. Dr. Gale of New York, in the last century, was the only leader in this direction, but without followers.

In all fevers we need the soothing influence of electricity, directed to the feet and legs, as well as to Repose and Coolness. As long as the power of these regions is maintained, by electrodes on the tibial region and behind the humerus, we have a recuperative influence working against the fever. Why has not this been accidentally discovered in a half century of empirical electro-therapeutics? It has not *entirely* escaped notice, as we find in the *California Medical Journal* a recommendation of Faradism as necessary in fever to soothe and strengthen the patient. It proposes to hold the negative on one foot and pass the positive all over the other limb, then to hold the negative on both feet and pass the positive over the trunk and arms, the operator holding the electrode and administering through his hands — which the writer says is more grateful than a wet sponge, but of course does not perceive the reason, for the reason is outside of medical dogmas. This is a very beneficial treatment, as the writer was convinced by experience, but needing to be completed by the current from the hypochondria to Coolness and Health.

Dr. Rockwell speaks of the reduction of the pulse effected by general Faradization — a pulse of 115 being reduced to 103. This is due to the tonic power of electricity and to the increase of vital force from stimulating the posterior surfaces and lower limbs, relieving the abdominal oppression. It would be much more marked by directing the current to the feet and to the locations of Tranquillity, Patience and Repose.

In all fevers we need the influence of the febrifuge antiseptics at the positive pole, to charge the constitution with their restorative power. We need currents to Health from the hypochondria, and to Coolness from Calorification. If the brain or lungs are much affected, we need currents to the tibial region from the anterior base of the brain and the anterior base of the chest. We need also currents from the abdominal surfaces to the lower dorsal region, which is impaired.

Of the remedies available in fever, I would mention Declat's syrup of Phenic acid, Dextroquinine, Salicin, Cornine and Gnaphalium, as febrifuge tonics. Salicin especially antagonizes painful and rheumatic conditions, and Gnaphalium has a special bearing on the lungs. Fucus Marina has, in addition to its febrifuge action, an alterative in-

fluence and favorable effect on relaxed, flabby or dropsical conditions. Pyrus malus (apple-tree bark) is a tonic and slightly astringent febrifuge, excellent in scarlet-fever, puerperal fever, affections of the throat, enlarged tonsils, enlarged liver, hemorrhoids, summer complaint and dysentery. Monesia, though not especially a febrifuge, is a fine antiseptic tonic, with valuable effects on the throat, lungs and uterine region.

We need, in addition to the tonic antiseptic febrifuges, those remedies which control and evacuate the morbid materials developed by fever. Bisulphite of soda has this purifying action, controlling decomposition and resisting microbe development and pyemia. Boracic acid is a fine antiseptic, with a very fine influence on the throat and brain. Condy's fluid, especially as an external application, is decidedly febrifuge, with a favorable influence on lungs and stomach, and anti-bacterial action.

The necessary evacuant and restorative influence on the bowels is found in a number of remedies. Chelidonium (celandine) is a very valuable and much neglected remedy. Its action externally is soothing and healing, fully equal to arnica, and hence it is valuable as an application to hemorrhoids, and its influence on the intestines is more favorable than that of aloes. It is a good application to ulcers and morbid growths generally, and affects the bladder favorably. It might well be substituted for other cathartics generally. As a very mild and healthy evacuant there is nothing better than the Juglans cinerea (butternut) in fluid extract or in the Juglandin, which compares favorably with that mild evacuant, Rhamnus frangula. Iris versicolor (blue flag) in fluid extract or its solid form, Iridin or Irisin, is in my opinion greatly preferable to the more fashionable and harsh Podophyllum and Podophyllin. It acts in a vigorous but restorative manner on the liver and bowels, with good effect on the kidneys and womb, and much more agreeable effect on the nervous system than Podophyllin. Gentian (Gentiana lutea) is a fine alterative tonic for the liver, and Leptandrin is a pure liver tonic; neither of the two is purgative.

Chelone glabra (balmony) is a fine tonic for stomach, liver, spleen and kidneys, useful in fevers and after exhausting diseases. Chianonthus acts very beneficially on liver, stomach, spleen, kidneys and bowels, with a fine soothing and relieving influence on the nervous system, which makes it valuable in bilious fever, though not actively evacuant. Grindelia squarrosa, a remedy little known, is a very efficient remedy for the liver, spleen and stomach, having great power to reduce enlargement and congestion, for which it is a very valuable external application. Rumex (water dock) is a very soothing, purify-

ing, cooling alterative. Its influence on the brain, stomach, lungs and female organs is very beneficial. Polymnia is perhaps our most efficient agent as a powerful alterative, reducing congestion and enlargement of the liver and spleen.

Of soothing agents in fever, I would mention Hops (Humulus), which has also some tonic influence, and Evening Primrose, which is especially soothing when heart and lungs are affected. Cereus grandiflora is a sedative which is not debilitating and which is very important in all affections of the heart. It is very appropriate in fever. Leonurus (motherwort) is a fine restorative nervine, in fevers and delirium tremens, which has no objectionable influence.

To tranquillize and relieve morbid states of the stomach we may rely upon Lettuce (Lactuca elongata) and Scrophularia Marylandica. Alnus rubra will assist in promoting the flow of gastric juice. Sambucus nigra (elder flowers) not only soothes the stomach but has a fine influence on the skin, and is very appropriate in fever; but for free perspiration we rely upon Crawley and Jaborandi. Nux vomica occupies an indefinite position among remedies, having a fine general influence, which may be appropriate in fever. It is tonic and alterative, assists torpid bowels and liver, and sustains the nervous system.

For stimulants to relieve depression we may rely upon Eryngium aquaticum as the most efficient; but brandy, wine and ale are sometimes useful, and electricity is the most important stimulant.

So far as diseases are dependent on microbes we must depend on the new remedies, which are not yet fully tested. Of these, Pyoktanin appears to be the most harmless, and has a fine influence on the nervous system, as well as controlling power over inflammations.

INTERMITTENT FEVER evidently requires a current toward the shoulders and spine; but as the chill is approaching there should also be a current between the lumbar region and Calorification. In the febrile stage the current should be from the hypochondria to the shoulders and to Coolness just behind the humerus. The spleen and liver in the hypochondriac region should receive the positive current, but at the beginning an alternating current would be best, followed by the positive.

Any strong impression, to rouse the spinal region and the occiput, would repel the attack, as was proven by Dr. A. Fenykovy at Nisch, when the military stock of quinine for the regiment gave out. He ordered that the patients should be rubbed twice a day along the spine with a simple ointment. The day following, the ague did not appear, and he has used this treatment since with such success that three-fourths of his patients have recovered without any quinine.

Any one familiar with what is called the magnetic treatment would

undertake to cure by manual treatment of the spine, and even the common rubber seems to have succeeded in this case. The treatment of the spine alone in such cases by cupping was tested by Dr. Gondret in 1850 (see page 85).

The cure of ague reported by Luke Howard, F. R. S., was a happy application of the principles of Sarcognomy, but seems not to have instructed the medical profession. The patients, on an insulating stool, received sparks at the epigastrium which were drawn out at the spine. The cure would have been still better effected if the sparks had been taken from the back of the shoulders or the summit of the dorsal spine.

Mr. Howard's application reduced the pulse speedily, if made in the hot stage; and a permanent cure was made in a few treatments, even in obstinate cases. Why should not this be the method in all fevers? In applying currents thus, the effect will be greatly increased by applying the proper febrifuge on the skin, and would be still more decisive if the skin were blistered; which, however, is rarely required.

In other cases electricity has been used with varying success, for want of guiding principles. The *Italian Universal Annals* says: "Electricity has been used by Frank, Borgini, Aldini and others; in these later times by Bossi of Rome, by Vizioli of Naples, by Shipulski, Krasnogladof, Deparquet, etc. Prof. De Renzi of Genoa has also largely experimented with it, and has found that in the majority of cases the fever is stopped, and frequently more promptly than with quinine. In nine cases the author has had five complete cures, two bettering, and two with no success. They were treated with the continued and the Faradic current, — the first obtained with nine to sixty-two elements, and applied five to fifteen minutes along the spinal cord. The Faradic current has been more efficient than the galvanic. These experiments have confirmed the possibility of conquering intermittent fever with electricity; but, so far, *it has been impossible to ascertain* why in some cases a rapid and complete cure is obtained, and in others an incomplete one, and what are the best means of application of electricity, and when it ought to be preferred to quinine."

What else could be expected from a purely empirical practice, with no principles to guide it. Cures can be made with either galvanic or Faradic or static electricity by those who understand Sarcognomy. Merely electrifying the spinal column is not enough in a serious case. The focus of the disease is at the spleen, and to a slight extent at the liver. Dispersing positive currents from that location are therefore necessary, and may be preceded by negative for a few minutes. The concentration must be upon the shoulder, aided by lumbo-hypogastric treatment, in the chill; and concentration from the hypogastric

region to behind the arm, in fever, — also to the tibial region, if the fever is high.

But as the patient is entitled to the speediest possible cure, the antiperiodic febrifuges should be applied under the positive electrode.

The importance of treating the spleen was demonstrated by Dr. Babaieff, whose experience is quoted in the *London Medical Record.* He found that Faradization reduced the spleen, and cured in some cases in which quinine failed. Dr. V. F. Sprinion is also quoted as testifying to the cure of his cases and reduction of the spleen by galvanic and Faradic currents. Four cases of intermittent fever were permanently cured by him with Faradization alone, in five to ten seances. Thirty cases of intermittent fever, — tertian, quartan and quotidian, — cured by electricity, were reported by Dr. Blackwood in the *Medical Bulletin* since, and forty-two cases were treated and generally cured by Dr. Schroder of St. Petersburg, whose principal reliance was Faradizing the spleen. One-third of Dr. Blackwood's cases were cured by a single application.

Galvanism is efficient in reducing enlargment of the liver and spleen, but should be aided by such remedies under the positive pole as polymnia, dextroquinine and grindelia squarrosa. Careful experiments have proved the power of quinine in reducing the size of the enlarged spleen. Muriate of soda and muriate of ammonia are almost as efficient. The reduction of the spleen and liver to a normal condition removes the foundation of intermittent fever, in doing which we may receive some aid from the iodide of potassium. But currents to the shoulder and spine are indispensable in the treatment.

The principles of Sarcognomy as to the treatment of all fevers are clear and simple. Currents must be passed from Calorification to Coolness and from Disease to Health. Currents should be passed from Calorification to the tibial region and foot to relieve the fever and disturbance of the brain. Organs that are congested should be treated with dispersive currents to the spine and to the region of Health, and the lower bowels should be sufficiently invigorated by lumbo-hypogastric alternating currents to promote the expulsion of effete matters. The kidneys, liver and spleen should receive tonic currents to enforce their duties, and with all these measures we should not neglect the proper febrifuges, administered by the medical electrode or in a wet cloth on the abdomen, through which the current is passed. In addition to these measures currents of hot water should be played against the abdomen, especially at Disease and Calorification, the effect of which would be increased if they were connected with the electrode of the positive current.

In all abdominal affections of an irritated or inflammatory character

the treatment would be similar to that of fever. In dysentery and peritonitis a wet cloth, saturated with the proper remedies and laid over the entire surface of the abdomen, should have the positive current passed through it (the electrode gliding over the whole surface) and the negative on the spine, the shoulders or below the knee, — generally in all of these positions, for all these effects are needed. When these measures are used they will rapidly supersede the old methods of practice.

Beard and Rockwell maintain that the Faradic is preferable to the galvanic in the treatment of all the viscera below the diaphragm, and to one unacquainted with Sarcognomy this may be a judicious direction, if it is understood that the currents are to be antero-posterior, — that is, that the spinal column shall be included in the circuit with the viscera, — for we thus invigorate the functions.

But when we understand Sarcognomy we perceive many occasions for a one-way current, which is the galvanic or the primary. Such a current is often necessary from the hypogastric regions upward to the shoulders, to overcome the ardor of fever, the depression of melancholy and debility, the derangements of the uterine system, and the morbific tendencies of the hypochondriac region. It is also sometimes desirable to send a current to the abdominal region to stimulate inactive organs for a few minutes, but this should be only an exception to the rule that visceral organs should be stimulated in association with their spinal support. This joint stimulation is well given by the Faradic current, but I regard the alternating galvanic current, supplied by a commutator, as more appropriate to the abdominal region. For this purpose I have devised a commutator propelled by gravity, the speed of which may be increased or diminished by regulating the weight. The liabilities to evil in the galvanic current are overcome by commutation, which changes it from a one-way to an alternating current.

The Stomach. — In the treatment of the stomach the Faradic current is available for producing emesis. By placing one pole over the stomach and the other in the throat or on the neck, a very strong Faradic current (from several cells) will produce efficient vomiting. This method has been used to dislodge obstructions in the œsophagus. Vomiting may also be produced by introducing one of the poles in the stomach, as an insulated sound.

The galvanic negative current in gentle application produces an increased gastric secretion. To produce a wholesome, vigorous action in the stomach, we should associate it with the lower dorsal region in our treatment. The whole gastro-intestinal tract shown on the chart should co-operate with the lower dorsal and lumbar regions. The layers of fat on the front of the abdomen frequently make a decided

hindrance to electric currents, requiring additional electro-motive force.

The abdominal organs all respond to Faradism. The stomach may be contracted in its length or antero-posteriorly according to the duration of the current. The circulation and normal action of the liver is increased and its congestion diminished; the congestion of the spleen is reduced and the gall-bladder contracted. A gentle galvanic current from the mouth to the anus moves the bowels, and Faradic currents are by some preferred for stimulating the intestines. The stimulation of their contraction is generally accompanied by increase of their secretions.

In all treatment of the stomach we must associate with it the lower half of the dorsal vertebræ. Doing this with Faradic or alternate currents invigorates the stomach and overcomes obstinate vomiting, but I have not heard of the application of this method to sea-sickness, to which it seems so appropriate. I hope some of my readers may have the opportunity of applying the current against nausea from the sacro-iliac symphisis to the summit of the chest just above the mammæ and also to the location of Health.

Nausea and vomiting require a current from the sacroiliac symphisis to the mammæ, and also to the centre of the scapula (Health); also from the hypochondria to Health. If resulting from inability of the stomach to digest its contents, alternating currents between the lower dorsal vertebræ and epigastrium would be proper. Very gentle currents from points one inch exterior to the occipital knob and half an inch lower — which is a nauseating region — to the location of Love or of Health would be beneficial. Currents of hot water on this spot would be beneficial, and the application of ice has been successfully used. Dr. Leven reported success by the application of electricity to the interior of the stomach with the œsophageal sound.

Nausea and vomiting may be controlled, like all other conditions of gastric difficulty, by direct invigoration with currents alternate or reciprocal between the stomach and the lower dorsal vertebræ. This is the standard measure for all gastric derangements, and has been very successfully used even in cases of very obstinate vomiting.

Cholera. — The great disturbance and deficiency of electricity in times of cholera would indicate the use of static electricity as an invigorating prophylactic. This opinion has been advocated by Dr. Vigouroux in the *Progres Medical*.

As great abdominal congestion and general prostration, often attended by great nausea, is the characteristic of cholera, it is certain that strong currents from the abdominal region to the shoulders and upper occiput would antagonize and control it, if given with sufficient

energy and persistence by either form of electricity. In severe cases hæmospasia and external heat (blankets wrung out of hot water) would add greatly to our control of it.

To this I would add vigorous Faradic or alternating galvanic currents between the lumbar region and the organ of Calorification.

The static current is equally or more efficient, but requires the aid of a commutator to act as an equable stimulant to the spinal and visceral system. I think my experiments justify the assertion that an efficient electric treatment will control cholera more effectually than anything that has ever been tried.

Diarrhœas are of course treated on the same principle as cholera and readily checked. In many cases the domestic remedy — salt, vinegar and pepper, in an agreeable dilution — is sufficient. In more serious cases Beach's Neutralizing Cordial (rhubarb, saleratus and peppermint in equal portions, with brandy and sugar, and sometimes cinnamon) or a little monesia or salacin would relieve, without requiring professional aid.

CONSTIPATION AND HERNIA. — Constipation is a condition in which all forms of electricity may be useful. The galvanic current from the mouth to the anus, even in the simple method of a zinc plate in the mouth and silver electrode in the anus, is a good remedy. The Faradic current between the spine and abdomen is especially valuable when atony or relaxation is the cause. The primary current with the negative on the spine is also efficient, and the alternating galvanic is better. The static current, either continuous or interrupted, is also very useful, and the use of a proper purgative in the medical electrode renders success certain.

Placing a negative electrode in the anus and moving the other over the abdomen has proved efficient in some difficult cases.

To overcome constipation we require effective treatment of the spinal column from the middle dorsal region to the sacrum. The ganglionic nerves along the column have no insulating material and therefore receive most freely the electric current, which is most effective when thus applied. Onimus and Legros say that: "Our physiological experiments demonstrate that the continued currents never provoke energetic and efficacious peristaltic contractions of the intestines, except when we electrize the *spinal cord or splanchnic nerves.* We *must act on the spinal cord* if we would affect the intestinal contractions. In paralysis and other nervous affections producing habitual constipation the electrization of the cord produces free and and frequent stools." It also restores the contraction of the bladder, producing a normal micturition, and the current to the stomach increases the secretion of gastric juice. The alternate current

between the spine and abdominal surface may be effectively used (the spine being covered by an electrode of vertical length). On the other hand strong interrupted currents or intense galvanic currents affect the nerves unfavorably, arresting peristaltic action, which shows that the galvanic is more appropriate than the Faradic current for intestinal action, though Onimus and Legros say that very feeble Faradic currents promote peristaltic action and Beard and Rockwell favor their general use for the abdomen

Purgation in difficult cases is effected by introducing a partially insulated electrode high up the rectum and using the other Faradic pole on the lumbar and abdominal surfaces. The *Journal of the American Medical Association* gives examples of its success after the failure of purgatives and enemata. The applications were made for ten or twenty minutes, and repeated at intervals of three hours.

Dr. Dewees says (in the *N. Y. Medical Journal*) : "There is in almost all cases of chronic constipation (from entire inactivity) excessive dryness, not only of the fæces, but of the mucous surface of the intestines. This state is speedily remedied by the current, the secretion of the bowels being announced in a few days. When the nervous prostration is very great, and the person should be of a relaxed leuco-phlegmatic habit, the gut is frequently found in an opposite condition, being relaxed and coated with a gluey mucus, the presence of fæcal matter not being noticed by the bowel. After a few days' use of the battery this becomes remedied, in both states; the intestine is stimulated, and a secretion of fresh mucus takes place, with increased propulsory powers."

A remedy so powerful in intestinal obstruction must necessarily be valuable in cases of hernia, when strangulated and almost impossible to return. Dr. Suprienenko, in 1882, demonstrated this in a case of inguinal hernia, which could not be reduced, by applying the positive pole on the hernial tumor and the negative on the lumbar vertebra, followed by application at the umbilicus. The hernia was overcome in about two minutes, for the application was judicious. In a still worse case, reported by Dr. Pergamin, after twelve hours of strangulation, fifteen minutes of Faradization and two minutes of manipulation, the hernia was reduced. Cerebral stimulants, as they divert from the pelvis, assist in the reduction. Strong coffee or belladonna may be used with benefit.

Four cases of hernia have been reported in medical journals, in which electricity succeeded after other treatment had failed. In one case an inguinal hernia of ten years' standing had become strangulated. Nothing could relieve it until Faradization was tried, which made an impression in a few minutes, and caused a total disappearance of the

swelling. In another inguinal hernia of twenty years' duration, strangulated for fourteen hours, it could not be reduced, but ten minutes' Faradization enabled them to reduce it, — one electrode being applied to the swelling, "the other to the ring and the neighboring abdominal walls." In another case, of eight hours' strangulation, fifteen minutes of Faradization made the tumor disappear. Another case of scrotal hernia as large as a man's head was Faradized in all directions and completely reduced, although three hours' labor upon it had previously failed. These cases were reported by a Russian medical journal.

DROPSY AND CORPULENCE. — That dropsy may be relieved by electricity is shown by a case reported by Dr. Koenig in the *Revue Medicale* (1830). In a man of fifty, after suffering lumbago, dyspepsia, hæmoptysis and œdematous swelling of the legs, the swelling extended to the abdominal cavity. He had costive bowels, scanty urine, frequent pulse, enormous distension of the abdomen, and extension of the anasarca to face and hands — yet purgatives and diuretics did no good. "Two needles were then inserted from one-eighth to one-sixth of an inch into the walls of the abdomen, on either side of the linea alba, and their number was subsequently increased. These were touched three times a day with the wires from a battery of sixty pairs, twenty or thirty contacts being made. The secretion of urine immediately increased, the skin became moist and the appetite returned. No internal remedy but infusion of juniper berries was used. In four weeks the œdema and ascites had greatly diminished, and a few weeks later the patient had perfectly recovered." (Channing.)

Dr. K. reported another case cured in the same way in three weeks, and also similar success in the use of galvanism in dropsies of the joints, in which he advises the needles to be introduced deep enough to reach the bone of the joint.

Dr. Schusten, in the *Revue Medicale*, testified to the successful use of electro-puncture in articular dropsies, pericardial dropsy, chronic hydrocephalus, hydrothorax, hydrocele and ascites.

Thus concurrent testimony shows the great power of dynamic electricity over all effusions from serous membranes, as Dr. Gale long ago demonstrated the power of static electricity, and Wesley said that "electrifying cured dropsies supposed incurable." All this shows that electricity (especially in the static form) is a great invigorator of organic life.

Hydrocele is readily cured with fine needles about four inches long. Dr. Pecchioli of Sienna originated the treatment nearly half a century ago. With four needles inserted in a double hydrocele and a current between them from a small battery, the fluid was nearly all removed in

five hours. Three treatments completed the cure. Several very satisfactory reports of such treatment were made soon after its introduction.

The removal of dropsy by Faradism, after diuretics and all known treatment has failed, is now so well established by experience that we need not review the graphic reports of such cases. I would merely suggest that it will be more efficient when the kidneys and the hypogastric region are treated, — the former increasing the urine and the latter the perspiration. We should not neglect the co-operation of diuretics and diaphoretics, which may be included in the current and will reinforce the electricity.

The Faradic treatment of the abdomen from its front to the spine is a valuable measure to impart vital energy to organs that tend to relaxation and congestive enlargement. Such treatment prolonged efficiently would improve the temperament and health, and diminish the abnormal fulness which is often a personal encumbrance. But to reduce corpulence we need in addition an ascending current from the organ of Nutrition to the shoulders. If the current be directed to the chest above the mammæ the moral benefit will be a desirable acquisition to all who are not already too amiable and delicate.

Rectal diseases may be treated by an electrode at the anus, or a flexible electrode introduced in the rectum, — the positive current overcoming relaxed congested conditions, and the negative serving to dissolve and dissipate tumors or morbid growths. In rectal treatment we should, as with all viscera, include the controlling spinal region in our treatment, which would be at the upper half of the sacrum.

In the treatment of hemorrhoids the dispersive positive current of dynamic or static electricity is generally successful. The electrode should be insulated, excepting the portion applied to the tumor. In some old cases, in which the tumors are not sensitive, the negative pole may also be used ; and in cases requiring surgery, galvano-cautery is used, while the patient is under anæsthesia. The tumors may also be destroyed by electrolysis — inserting platinum needles heated by the current.

Dr. Robert Newman of New York, having succeeded in the cure of urethral stricture by electricity, applied the same method, in 1871, to strictures of the rectum with success. The power of electrolysis against morbid growth and strictures has been well demonstrated in practice, yet as a matter of course still has the opposition from distinguished surgeons which is regularly arrayed against radical progress.

In this treatment the galvanic current, regulated by a milliampere meter, is applied through an electrode which is insulated, ending in an

oval nickel-plated bulb from three-eighths to one inch in diameter, increasing as the stricture is expanded. The positive pole is applied by a wet sponge to the hand or abdomen of the patient, and the negative metal bulb, lubricated with glycerine, introduced to the stricture. The current is gradually raised from zero to as much as is well borne, varying from five to fifteen or twenty milliamperes, but generally near five. In a seance of from five to fifteen minutes the electrode being kept against the stricture usually overcomes it and passes through. The current is then reduced to zero and the electrode removed. "Seances may be repeated in one or two weeks." The electrodes are flexible and no force is used. In some cases it may become necessary to use needles in the substance of the stricture. This method succeeds where all other methods fail, and if it does not make a complete cure it produces decided improvement. Ten to fifteen cells are commonly used and a much stronger current can be borne than in urethral stricture. The patients experience great relief from a condition that is prostrating. Rectal diseases derange the whole nervous system.

Rectal diseases have been very successfully treated by electricity. Dr. W. S. Shotwell (*Maryland Med. Jour.*) claims that it is superior to all other methods. His method is that of cutting through a fistula with a loop of platinum wire by a cauterizing current. He says the wound heals well without any dressing, but the bowels must be kept constipated one or two weeks. Hemorrhoids are treated also with a cauterizing loop of wire round the protruding hemorrhoids.

THE LIVER. — We are told, in a recent publication by a Professor of Johns Hopkins University, that: "No effects are produced upon this organ by the electric current, so far as our present knowledge extends." The liver, however, is not an exceptional organ in the human body, and it is easy for any investigator to prove its excitability by electricity. It is therefore astonishing that such a statement should be found in a scientific text-book. Even the gall-bladder can be made to contract by direct electrization.

Dr. Wilson Philip says: "I have repeatedly seen the same effect upon the biliary system which arises from calomel; a copious bilious discharge from the bowels coming on within a few hours after its employment."

The hepatic secretion is best promoted by alternating galvanic currents through the liver from side to side and from the right hypochondria to the spine at the seventh dorsal. For giving tone to a relaxed and congested liver, I would use the Faradic current. Currents between the liver and upper dorsal region have a tonic effect upon it.

Dr. W. H. King, in a recent work on electro-therapeutics, says:

"In functional disturbances of the liver I know of no remedy equal to galvanism. A medium-sized electrode (positive) should be pressed down under the ribs as near the liver as possible, and a large negative electrode on the back in such a position as to bring the liver between the electrodes; a current as strong as can be borne should be passed for ten minutes at each treatment, and repeated two or three times a week. It is sometimes astonishing how the symptoms, such as mental depression and uneasiness of the right hypochondria, dependent upon it, disappear. After an acute hepatitis, which has left inflammatory deposits, this same treatment is very efficacious. In such cases the current can be reversed with advantage." This accords with Sarcognomy, and is the language not of a book-maker, but of a therapeutist.

The electric current should be medicated with Leptandrin or Hydrastin to make a tonic impression on the liver. To excite its secretion we may use Iris or Iridin, Gentiana quinqueflora, Berberis (Barberry) and Cellandine. To overcome congested conditions we may rely upon Polymnia, Grindelia squarrosa, and the tonic power of nitro-muriatic acid in a weakly acid solution applied by a wet cloth or in a foot bath.

We may act upon the gall-bladder by a current sent at the lowest level of the tenth rib on the right side, and on the spleen at the corresponding locality on the left side — marked G in the front view of the viscera.

ELECTRIC DEVELOPMENT. — The power of electricity to promote growth has often been demonstrated. One of the most decisive illustrations was the experiment of Dr. J. Reid on a frog (*N. Y. Jour. Med., May, 1847*), the spinal nerves of which were cut so as to paralyze the posterior limbs. On one side daily exercise of the limb was given by a weak battery, and at the end of two months it was unimpaired in development and strength, while the other limb, without electric exercise, was reduced to half its size and its contractility impaired. Electricity sustains not only the nutrition and strength of the muscles, but the normal state of their nerves, on which their strength mainly depends. Galvanism has not so much effect when the nerves are degenerate. Its operation is to raise the temperature and increase the circulation, which is followed by increased muscular power. As it operates through the nerves, the spine as well as the local nerves should be under its influence. Even in such a case as dropped hands from lead poisoning, which would seem to be local, the best effects were produced (by Dr. Bird) by sparks from the upper part of the spine. The local treatment was not usually effective.

To promote growth, according to the principles of Sarcognomy, the

currents should be directed to the regions of Nutrition and Vital Force, from the portions of the chest anterior and inferior to the axilla. The purpose will be promoted by stimulating the lower dorsal region and the adjacent portions of the back, which will promote digestion and assimilation.

TREATMENT OF THE PELVIC ORGANS.

One who learns by experience the value of electricity in controlling all female conditions and diseases will realize the vast amount of suffering endured by women, which might have been prevented by enlightened electro-therapeutics. I have just been treating a very intelligent lady who had for years suffered terribly at her menstrual periods, sometimes equal to the pains of confinement, with prolonged debility, without relief from the profession. In one hour after I began she was free from pains and discomfort, and passed through the day, which had usually been a period of suffering, as bright and happy as in her best condition.

In all uterine affections electricity is of supreme value, and if aided by Helonias, Aletris, Cimicifuga and Viburnum compound, it should relieve women from menstrual troubles and add greatly to the evolution of an improved generation.

In amenorrhœa strong stmiulation is needed by alternating currents through the uterine and lumbo-sacral regions. In some cases, where the emotional nature is depressed, currents between the mammæ and and scapula (Love and Health) will assist.

In menorrhagia, a strong, tonic, positive influence should be applied to the groin and the uterine region — the negative being applied to the lumbo-sacral, the scapula (Health) and axilla.

In dysmenorrhœa the condition may incline toward the inaction and feebleness of amenorrhœa or the hyperæmia and relaxation of menorrhagia, requiring corresponding modification of treatment. An alternating lumbo-hypogastric current is generally appropriate. The influence of the negative pole at the lumbo-sacral is most important. Sometimes it is necessary on the scapula and axilla.

Cases of menorrhagia and dysmenorrhœa have been treated heroically by the positive pole of galvanism vigorously applied to the womb when it was much diseased. Dr. Mayo-Robson, F. R. C. S., speaks of using a current of 150 milliamperes for eight minutes with the positive pole in the uterus. He used a fifty-cell Leclanche battery. For such a powerful current the circuit between the poles was probably not more than a few inches. Through the entire length of the person it would probably give but ten to fifteen milliamperes. One to two hundred milliamperes have been used in treating fibroid

tumors of the uterus by the method of Apostoli, which destroys the tumor.

After parturition the condition is similar to that of menorrhagia, and requires positive currents to the womb, either externally or through the vagina, carried to the lumbo-sacral, the scapula and the axilla. This produces a prompt and satisfactory recovery, and physicians are beginning to find it out. Dr. Apostoli has proposed it to the Paris Academy of Medicine, recommending after labor the application of the primary current to the womb eight or ten times in six days, and in cases of difficult labor fifteen or twenty times in ten to fifteen days, to hasten the restoration of the uterus and avoid slow convalescence. These views are very correct, but the application might be made twice daily. He also advocates strongly the use of Faradization, in every case of labor, as safe and successful — an opinion sustained by the best English and American practitioners.

The plain instruction of Sarcognomy is that, as electricity (especially in the secondary and primary currents) is a powerful muscle contractor, producing this contraction by assisting the vital force, and as the lumbo-sacral region is the controlling region of the pelvic organs, there is no reason why we should not use alternating currents, Faradic or galvanic, between the lumbo-sacral and uterine regions, whenever we need to invigorate the womb to perform its full duty in childbirth.

Experience, too, has amply shown that this use of electricity is far better and safer, more prompt and reliable, than the use of ergot, and, instead of exhausting or injuring, leaves the patient in far better condition than when she is exhausted by her own unaided efforts.

Various methods have been suggested, none of which are so proper or beneficial as what Sarcognomy suggests. To reach the womb through the parietes of the abdomen does not bring into play the sustaining nerve force of the lumbo-sacral region, and we know that nerve force is necessary to sustain any action. The most powerful action is produced when the spinal cord is stimulated, and Ziemssen's experiments on the exposed heart show that a current directed to its ganglia made a stronger impression than currents merely to its substance, greatly increasing its action. Currents applied only to muscles are much slower in producing effects than when the nerves are included. Hence I object to treating the uterus without the aid of the lumbo-sacral region.

To send the current through the womb vertically, through the cervix and fundus, as proposed by Dr. Radford, or from the nape of the neck to the os, as proposed by Dr. McKenzie (which is the worst of all methods), fails also in stimulating the proper spinal region, and

involves a serious danger to the head of the child, whether it is toward the fundus or the os, for a strong Faradic current might be fatal.

The current between the cervix and the abdominal walls at the fundus, which is the only method proposed in the work of Professors Liebig and Rohe, is very objectionable.

Obviously there is but one proper method, which I have stated, and the current should be an alternating or reciprocal one, giving strong stimulation to the spine. It should be applied so as to reinforce the efforts of nature at each contraction, or may be used to rouse contraction, if it has failed, and should not be continued long enough to produce exhaustion.

Thus used, it diminishes the suffering, promotes expansion of the mouth of the womb and completes the expulsion of the placenta, operating also against the liability to hemorrhage and diminishing the exhaustion. Finally, by application at the completion of labor, it restores the tone of the parts and promotes a rapid recovery. For this object we need the positive current at the womb and groin, with the negative at the lumbo-sacral and the scapula.

It may also be necessary sometimes to relieve the depression of the patient by a current from Melancholy to Cheerfulness.

The applications to the parturient woman should be by broad electrodes or by the hand of the operator, using a wrist band to give the current to his hand, with which he may give the manual pressure desired and also learn the progress of the case; the use of his hand moderating the current and keeping him well informed of its strength.

There has been a great deal of heroic treatment of the womb by surgeons which electricity renders unnecessary.

In the words of Dr. G. B. Massey, electricity is an absolute substitute for sharp curetting in all cases, and, where it can be conveniently performed, this operation is unjustifiable in the future. As compared with caustic and caustic solutions, it possesses the advantages of being easily and absolutely controllable, permitting either an alkaline or an acid caustic action to begin gradually and be terminated at any desired instant, accompanied at the same time by a distant action of a salutary nature. The caustic effect, moreover, may be confined to the interior of the uterine cavity, leaving the cervical mucous membrane untouched, or *vice versa*, by the use of a form of intra-uterine electrode devised by the author. As a means of controlling hemorrhage from the uterine cavity, whether due to malignant disease or not, powerful positive cauterization is unequalled." "It is an agent capable of being properly applied without the need of a very great amount of technical skill. Unfortunately such a student must also consent to abstain from reading any but the most recent works upon electro-

therapeutics." "I have more than once been simply astounded at the lack of acquaintance with elementary physics on the part of physicians actively engaged in this work."

STRICTURE of the urethra, which results most generally from sexual abuse and excess as well as venereal disease, and is generally preceded by inflammation, occupies the most sensitive part of the human constitution, which has the most powerful influence over vitality, acting directly through the lumbo-sacral region. It produces sexual debility as well as nervous prostration. Bougies of soothing and tonic character introduced into the urethra give relief and sometimes cure, but electricity is the reliable treatment.

The cure is effected by electrolysis; that is, the dissolution and absorption of the morbid structures, and removal of the afflux. The positive current externally is proper for the latter, but a mild application of the negative pole in the urethra is what is required. Force is not used, nor anything at all painful. It is administered by a metal rod with a bulb on the end, about half an inch long — the rest of the rod being insulated by a catheter. The negative pole is less painful than the positive in this application. The alkaline development by the negative pole causes the dissolution and absorption. The currents must be weak; strong currents are injurious. The positive pole is quite objectionable in the urethra, as it coagulates the blood and produces a hard cicature. The Faradic current, which is useful as a tonic, is beneficially used in spasmodic stricture.

This method of galvanic chemical absorption has been demonstrated by Dr. Robert Newman. In some tough, obstinate cases, however, he uses strong currents and leaves the catheter in the urethra to prevent adhesions.

The positive pole, in these treatments, he placed in the patient's hand or on the thigh, or the supra-pubic region. In treatment of the genitals, from four to eight cells are usually sufficient. Repetitions of the application were made by Dr. Newman but once in from two to four weeks. He warns against frequent repetitions.

Of course there is danger of urethral fever if harsh or imprudent methods are used, but by the combination of medicine with electricity, as in using *medicated currents* and also medicated bougies, I think all unfavorable results may be prevented. Currents which would produce inflammation may be used if guarded, as medical electricity, by cocaine or theine.

"Electrode bougies" (says Dr. Newman, who has been most successful in the management of stricture) "are firm sounds insulated with a hard-baked mass of rubber. The curve of the bougies is short. The problem is to absorb the stricture, not to cauterize," by "weak

currents at long intervals." "As a general rule, six to twelve cells may be used." "All strictures are amenable to treatment by electrolysis." "Pain should never be inflicted." "For the absorption of the stricture, the negative pole is always used." "For the positive pole a carbon electrode is used, covered with sponge, moistened with warm water, and held against the cutaneous surface of the patient's hand, thigh or abdomen."

The location of the positive pole is not a matter of indifference. The nearer it is placed, the milder must the current be. Any part of the hypogastric region (the front of the pelvis) would be appropriate.

Impotence may be treated both by galvanic and Faradic currents between the lumbo-sacral and sacral locations and the genitals, which may be placed in a cup of warm water. The posterior electrode has been placed also in the rectum with success.

In cases of Spermatorrhœa a current from the groin to the lumbo-sacral region is the most appropriate. The positive pole was applied to the perineum successfully by Dr. Newman.

SKIN AND LIMBS.

SKIN DISEASES are effectively treated by galvanic currents. As a general rule the negative current may be applied through a sponge or roller electrode, followed by the positive. The sponge should be saturated with the proper remedies, among which I would mention Sambucus (elder flowers), Parcira brava, borax, alkaline washes, carbolic acid, menthol, veratrum viride, campho-phenique, camphor and salicylic acid, equal parts, rubbed together with water, like honey and subnitrate of bismuth.

Galvanism was successfully applied to a case of œdematous erysipelas (*see Boston Med. and Surg. Jour., Oct., 1846*) occupying the whole limb from groin to foot, enormously enlarged. The galvanic current through the limb greatly improved it, and reduced it to one-half of its size.

FELONS may be successfully treated by the positive pole of either the galvanic or Faradic current. Both have been successfully used.

CANCERS are beginning to be treated by electricity, and the results indicate that this may become the most successful method.

TREATMENT OF LIMBS. — SPRAINS are promptly relieved by galvanism, which relieves the sprain immediately.

Rheumatism, like neuralgia, in chronic cases sometimes requires severe treatment. If the positive pole is placed near a rheumatic joint, with a broad carbon or sponge electrode, and on the other side a metallic wire brush applied on the negative,— which is a very frequent method,— the combined effect of the current and the counter-irritation

on the skin will relieve cases in which other methods fail. Prof. Seeligmuller reports its success in a German journal. A similar success is obtained with static electricity, when sparks are vigorously drawn so as to irritate the skin.

Rheumatic swellings of the joints and other parts were cured by Dr. Hoering of Heilbronn by galvanism.

Dynamic electricity was successfully employed by M. Heller of Stuttgard to cure a case of false articulation with callous overgrowth from a fracture of the thigh of eight months' duration. Twelve applications, with one pole on the tumor, the other applied to the hand or foot, produced complete absorption of the callus.

CONTRACTIONS from paralysis or rheumatism require galvanism. A case is reported by M. Breschet (Hotel Dieu) of permanent spasmodic contraction of the fingers cured by galvano-puncture (twenty-five or thirty plates being used) after twelve applications.

Dr. Hoering reports a case of spontaneous luxation of the femur of the left thigh, in which the ligaments were strengthened by electric treatment applied to the left sacral and inguinal regions, with success after sixty-four applications of fifteen minutes. Curvature of the spine and weakness of the back have been treated beneficially by electricity, which in cases of curvature strengthens the muscles.

USE OF APPARATUS.

For the foregoing treatment the common portable battery, costing ten or fifteen dollars and supplied with a muriate of ammonia cell, will give good results, which will be greatly enhanced by using the medical electrode and adapting the remedy to the patient. A great addition is also made by magnetism, increasing the soothing, sustaining and tonic influence, especially fitting it for fever, inflammation and nervous debility. This combination is effected in my magnetic battery.

The unwieldly size and cost of the galvanic battery has limited their use, but by combining the cells with a magnetic coil, to give electro-motive force, a powerful galvanic battery can be produced, not weighing over ten pounds, and therefore very portable, while costing but half as much as the usual style of battery of equal force.

The maximum therapeutic value of electric apparatus, however, is found in the statico-magnetic machine. In this the nervous stimulation of static electricity is combined with the deeper and more permanent action of magnetism, a tonic, soothing and conservative agent, operating upon the tissues in a restorative manner, and thus supplying all that is lacking in static electricity. When the static current is also combined with a medical influence, it becomes competent to pro-

duce cures so prompt and marvellous as to excite astonishment. The expense of such apparatus and its imperfect construction have hindered its adoption, but even the most imperfect static apparatus yields admirable results in practice, and makes a successful impression on any form of disease.

The idea given out by some physicians and manufacturers, that no satisfactory results can be obtained from instruments costing less than three or four hundred dollars, is absolutely untrue. A static apparatus with my improvements for magnetic and medicated currents can be furnished for from sixty to seventy-five dollars, which will accomplish all that is realized by the most costly machines in the way of electric potency, and many curative results beyond their power. The static apparatus with my modifications can give two distinct therapeutic treatments at the same time to two patients, which treatments may be essentially different.

Of the value of mineral magnetism as a hygienic power, and the method of using it, an additional chapter would be required for a proper exposition, but it would delay this volume, which has already been delayed so long that I must postpone that subject to a special treatise on electricity and electro-therapeutics, which I have long contemplated.

ELECTRO-PUNCTURE (introduced in 1816) is performed with needles not oxidizable, such as gold, silver, platinum or aluminum. It is powerful in the treatment of tumors and in producing coagulation in aneurisms. With a strong current the needles may be made red-hot for cautery. Two or three large cells will be sufficient. It is also successful in the severest cases of neuralgia. Majendie, with the electro-magnetic apparatus, cured a case of most intense and insupportable neuralgia in the superior maxillary nerve of the left side of the face, in a few minutes, by inserting the positive needle near the origin of the nerve and the negative near its terminations. In treating neuralgia of the tongue by this method, the pain was driven into the mental branch of the inferior maxillary; from that it was expelled in the same way, and went to the infra-orbital nerve, from which it was finally expelled at the same sitting.

The first application uniformly relieves, but repetition is needed to perfect the cure.

Galvanism is employed with equal success either by puncture or by contact, and in severe cases strong enough to excoriate the skin, as from a forty-cell battery. Perspiration of the part is a common effect. In sciatica the current is passed down. There is ample evidence of the success of this practice in the worst cases. But relief is also obtained from static electricity by drawing sparks, which is

more agreeable. No matter where the neuralgia, or how severe, electricity furnishes a cure.

Obstinate cases of chronic rheumatism have also been successfully treated by electro-puncture, and gout has been heroically treated by French physicians — the platinum needles being inserted in the inflamed part and made incandescent, so as to produce an ulcer, which serves for counter-irritation.

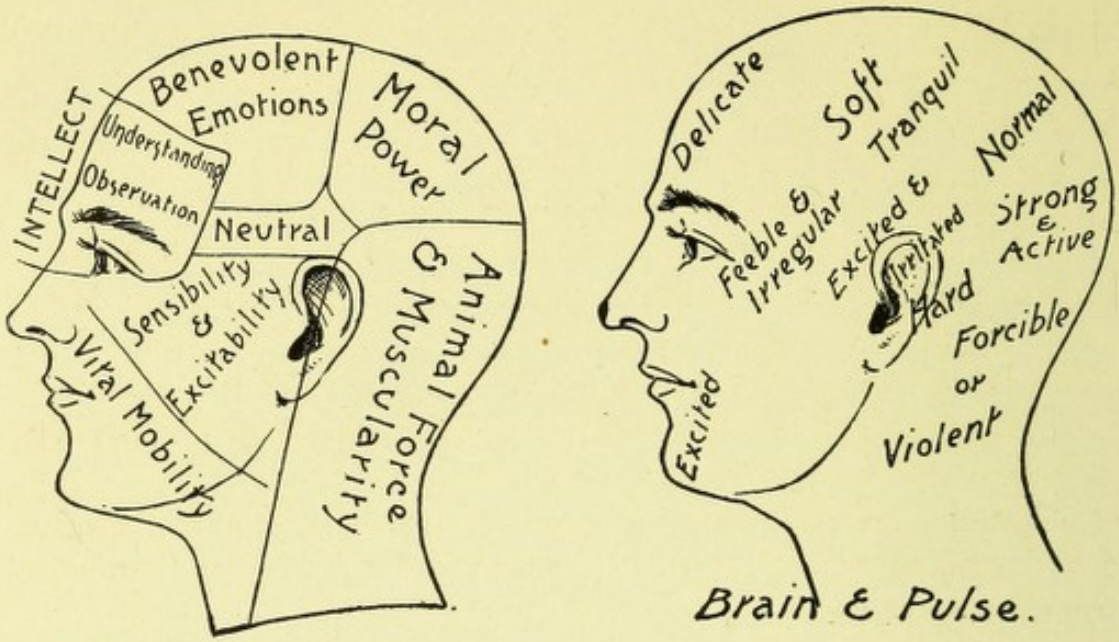
Cauterization is a successful remedy for poisoned wounds, if promptly applied. Two dogs were inoculated with the saliva of a rabid dog at Alfort Veterinary College. One died in twenty-eight days with hydrophobia. On the other the wound was cauterized with a forty-eight-cell battery, producing an eschar, which was detached on the twelfth day, preventing hydrophobia. In another case of a dog bitten by a rabid animal and cauterized *forty-four hours afterward* there was no symptom of the disease after four months. Another pair of dogs was inoculated with saliva of a rabid dog, one of which died of hydrophobia in twelve days, and the other, cauterized *after fifty-four hours*, was still well four months afterward.

MEDICAL ELECTRICITY.

The transmission of medical potencies by a current of electricity has long been with me a familiar fact, although it has been excluded from the knowledge of the medical profession by the materialistic dogmatism of the colleges. But for this dogmatism it would long since have become known. Physicians using electric apparatus, and discovering transmission of disease to themselves from patients when they hold the negative electrode, would have learned the carrying power of electricity. They would also have observed the difference in electric currents from different apparatus, and the unpleasant metallic influence from the apparatus in common use.

To those who are familiar with psychometry, and who know that a medical potency can be felt from remedies held in the hands without actual contact of the medicine, the increased transmission of that influence by the addition of a current does not appear strange.

I have been accustomed to instruct my students by placing them in a group with joined hands, generally moistened, and sending a current through the group, which has passed through a small portion of medicine, which is sometimes used to saturate a piece of cloth or placed in a convenient electrode. The effect is always felt throughout the group by each one, but with different degrees of intensity in proportion to their sensibility. When their sensibility is equal, it is generally felt first by those nearest the medicine. They are generally able to describe the influence and properties of the medicine as well as if they had taken an effective dose.



As the reader will much better appreciate the contents of this volume by having even a limited knowledge of the *demonstrated* cerebral science, which is the main body of Anthropology, I present here an illustration of the general character of the different surfaces of the brain, ascertained by exploration of its exterior and interior regions — its basilar surfaces being represented through the face and neck. Each large division contains almost innumerable subdivisions, for I doubt if any two adjacent portions of the same convolution have precisely the same function. The subdivision has been carried as far as seemed judicious and practical, in my published busts and charts, in which one hundred and twenty-four subdivisions are presented, but are still incomplete statements of the various powers of the soul and organs of the brain.

The physiological action of the brain upon the circulation as determined by experiments, is shown in the other engraving by the modifications which each region makes in the pulse.

The entire science of the brain, with its derivative sciences of Psychometry, Pathognomy, Pneumatology, Zoology, Archæology, Sociology, etc., introducing a new world of thought, will appear in the SYLLABUS OF ANTHROPOLOGY. The demonstrated doctrines of this science are in harmony with the most recent demonstrations by vivisection, though discovered nearly fifty years ago. They confirm many of the discoveries of Gall and Spurzheim, but modify or reject others. They have long been demonstrated in my collegiate lectures, and have been demonstrated as often as I thought necessary before scientific committees with universal acceptance. That I have not recently been engaged in urging them on professional or public attention, is due to the fact that professional men, even when convinced of scientific truths of a revolutionary character, have generally no disposition whatever to engage in the cultivation of a science foreign to all collegiate teachings and entirely unfamiliar to their patrons. I hold myself ever ready to repeat the demonstration of the psychic and physiological functions of the brain whenever any body of scientists worthy of such attention shall engage in the investigation. If the French Academy or any similar body in England should ask for a verification I would go abroad to meet them.

(Opp. p. 615.)

When the medicine is concealed in an electrode its effect is not diminished, and the description is soon given. When visited by Dr. A., a very intelligent physician, actively engaged in the use of electricity, I placed in his hands an electrode in which I had concealed a fluid extract of hyoscyamus. When the current was passed, he promptly recognized a soothing nervine influence, and in less than a minute expressed the opinion that the medicine was hyoscyamus.

I could procure as many testimonials to such facts as I had time to collect, but it seems as needless to accumulate testimony to a fact so easily shown as to prove in that way that ether is an anæsthetic. But a group of students were recently in my office and I publish here the statement made by them, remarking that four of the number were intelligent and experienced physicians.

The fuller illustration of medicated electric currents and of magnetism combined with electricity is reserved for a special treatise on electro-therapeutics.

BOSTON, June 3, 1890.

The undersigned have realized personally, in numerous experiments, that we are capable of feeling the medical influences of various medicinal substances, not knowing what they were, by receiving a current through the hands of either chemical or static electricity which had passed through the medicine in solution, and also would state that we have recognized the influence of a magnetic current, distinct in character from any form of electricity, by receiving a current which had passed through a magnet.

J. L. ASIRE,	EDW. C. WALES,
J. P. CHAMBERLIN,	M. E. ELLWOOD,
W. E. WHEELOCK,	B. EDDY,
J. W. HASTINGS,	MARY E. STRINGARDT,
S. C. GRIFFIN,	HELEN C. CLARK.

NOTE. — The injurious influence of a negative electric condition has not heretofore been properly understood, because it serves to attract circulation and bring the flow of electricity toward the negative electrode. To give the patient the benefit of electricity without the depressing effects of the negative condition, there should be a resistance on the negative side at least equal to the resistance of the current through his body, unless we desire the special effects of the negative pole. This resistance must be effectual. With static electricity the proper condition is observed when the negative pole is held several inches from the body, or is held over the clothing while the positive is in contact with the body. But even when held thus, it may produce too much effect if it presents many fine points. I have an electrode of this construction which produces very depressing effects. The administration of the positive current through the body of the operator would be beneficial in proportion to his own vital condition, if the resistance on the negative side were equal or greater, but without that precaution the negative influence might counteract all the benefit from the transference of vitality. Many injurious effects have been produced in treatment from ignorance of these principles.

CHAPTER XXVI.

PATHOLOGICAL DEMONSTRATION OF SARCOGNOMY.

Change of plan — Concise review — Sympathy of BRAIN AND SKIN — Climate, cold, heat, moisture, electricity, clothing —Fever — Meningitis — Clammy sweats — Electric shocks — Nervous prostration and sweating — Dr. Luys on the intellectual influence of the skin — Illustrations of cutaneous anæsthesia and impairment of the brain — Eruptive fever and cerebral inflammation — Small-pox, erysipelas, and scarlatina —Typhus and typhoid fevers — Sympathy of subjacent organs.

PULMONARY SYMPATHIES — Correspondence of lungs with brain and relation to the Pons Varolii as the seat of respiratory power —Relation to the nose and mouth — Effects of catarrh and asthma — Sunstroke— Experiments on rabbits — Consumption and its psychic symptoms — Heat and perspiration — Bronchitis and affection of the front lobe — Its exhausting effect — Sympathy of the abdomen with respiration — *Pneumonia:* affecting the whole brain, delirium, heat of skin, perspiration, antagonism to abdominal organs — *Pleurisy:* its relation to the womb; its more violent manifestations — *Laryngitis:* its influence on the brain — *Sympathies of the Heart:* Its correspondence in the brain — Mania from heart disease — Prostration of the brain and impressibility — Mistakes of carditis for brain disease — Close sympathies of heart and brain — Different effects from other organs — Ganglia in the neck — Connection of apoplexy and hypertrophy of heart.

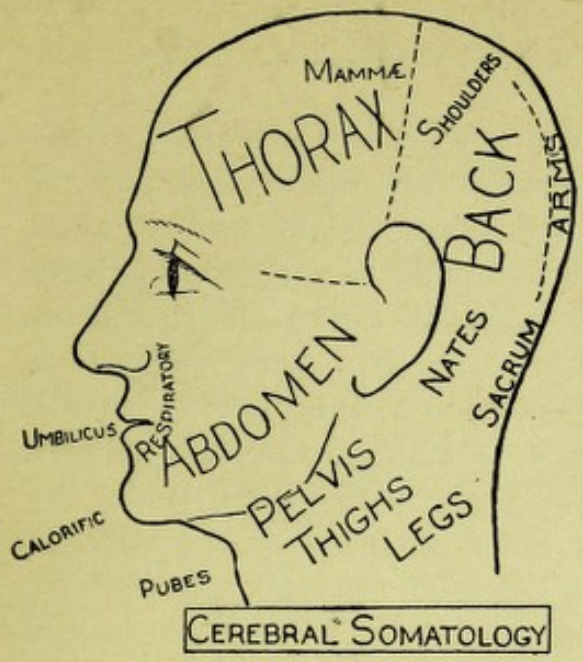
RELATIONS OF THE LIVER and subjacent region — Disease of its controlling temporo-sphenoid convolution — Relations of different parts of the liver — Its proximity to morbid influences — The great depression of spirits that it produces — Its influence in delirium tremens and in jaundice — Difference of its upper and lower surfaces — Morbid character of abdominal inflammation — Dysentery, typhoid, irritation of rectum and anus — Melæna — Fevers omitted.

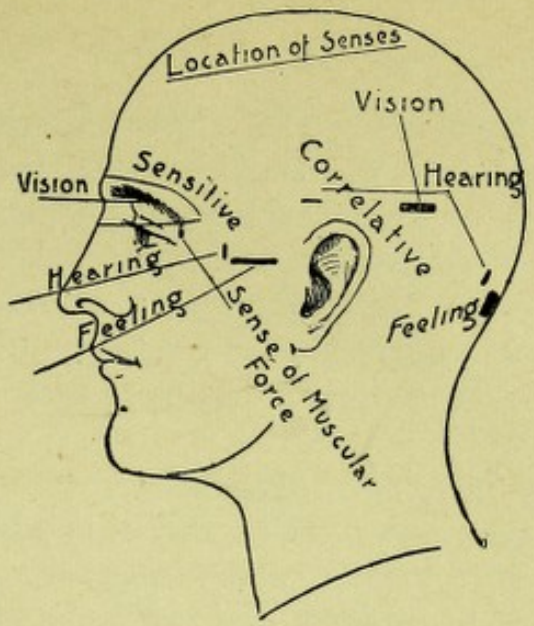
SYMPATHIES OF PELVIC REGION — Relation to under-jaw region and destructive effects on nervous system — Illustration of this by orificial surgery — Relation of womb to hyperæsthesia and hysteria — The two regions of sensibility in the brain and in the body — Relation of uterine disease to insanity — Sympathy of brain and body not uniform — Pain of urethral caruncles — Prostrating effect of chronic diseases of the colon — Statements of Dr. Prout — Cases of rectal obstruction in Ireland — Injury of sacrum in a boy — of coccyx in a woman — Fractures of thigh — Mental phenomena of hysteria and quasi disease — Inflammation of the bladder — Influence of the sexual faculties — Physiological explanation — Extreme contagiousness — Puerperal mania — Morbid effects from glans and prepuce.

SYMPATHIES OF THE LIMBS — Correspondence of upper and lower — Passionate tendencies of gout and rheumatism — Remarkable effects of injuries of the knee and the foot. Conclusion.

In preparing the present edition of Therapeutic Sarcognomy, I had made a review of the phenomena of diseases as recognized by standard authors, showing that the doctrines of Sarcognomy in reference to all parts of the body are fully sustained and in fact demonstrated by the phenomena of all organs in a state of disease. In fact a wise pathologist might have constructed something like a correct Sarcognomy by studying the physiological and mental effects of diseases.

At the last moment I have reluctantly given up the idea of includ-



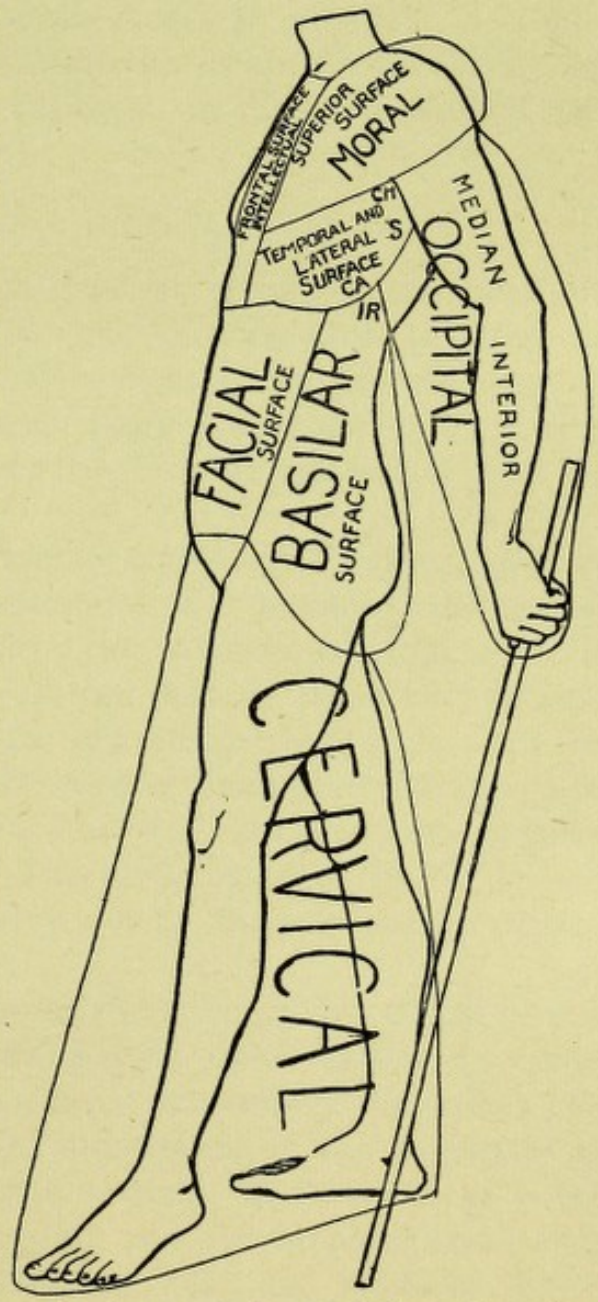


CEREBRAL SOMATOLOGY

To assist in understanding the complex relations of soul, brain and body in disease which are illustrated in Chapter twenty-six, I have presented the chart of CEREBRAL SOMATOLOGY, and another of CORPOREAL CEREBROLOGY (if such a term may be allowed) showing to what part of the brain the various parts of the body correspond. These correspondences are shown in disease more conspicuously in proportion as the sensitiveness of the nervous system establishes more perfect and controlling sympathies between all parts, and are of course less apparent when the nervous sensibilities are dull. The sympathies and the *psychic capabilities* of the nervous system are so great as to appear incredible to all who are not familiar with the subject, and as all these marvellous phenomena are carefully excluded from the curriculum of medical colleges I must refer the reader who desires to understand the higher phenomena of life to my Manual of Psychometry, now in the third edition, and the Syllabus of Anthropology, which I hope to issue about the end of 1891.

I have introduced a sketch of the locations of the senses, which I discovered fifty-three years ago, and have taught and demonstrated ever since. The centre of vision is at the base of the front lobe, vertically over the pupil of the eye, and the function is shared by all the convolutions behind the brow, each of which contributes an important element to its perfection, in the ability to recognize objects. *Hearing*, behind the eye, is adjacent to the fissure of Sylvius, and the organ of Language. *Feeling* occupies the anterior exterior portion of the temporo-sphenoidal lobe, at its base, parallel to the zygoma. These are the sensitive organs, but each anterior organ depends for its reinforcement and efficient energy upon a correlative occipital organ, according to a general law of cerebral science which may easily be demonstrated, and my demonstrations are always accepted. The occipital organs which sustain the external senses are indicated in the engraving as correlative. Of these the correlative organ of vision is the part called the *gyrus angularis*, and vivisectors, having demonstrated its importance, have been led with Ferrier to believe it the entire seat of vision, which is a mistake, as the visual is an intellectual function and all intellectual functions are frontal. The *cuneus*, to which some would refer vision, co-operates with the gyrus angularis, but the latter is the essential seat of ocular vigor.

As for hearing and feeling, their correlatives are near together, but hearing has a correlation also with the opposite ear, in the region above the ear, recognized as Cautiousness, a vigilant impulse which listens to *all sounds in the vicinity*, while the occipital organ relates chiefly to language and music. The correlative above the ear has been demonstrated by vivisection, but the occipital has not, as it is less developed in animals. The various forms of feeling and touch are subdivisions of the organ of Feeling; *smell* and *taste* are in its anterior portion.



The discovery of the correlative or sustaining organ of vision has been verified in pathological cases. In a case reported by Ratenoft, a student, twenty-two years of age, accidentally shot himself with a revolver, through the posterior parietal region of the brain, and produced complete loss of vision, but no motor or sensory symptoms. After opening the wound and removing the blood clot on the second day, vision returned, but with left lateral hemianopsia. Epileptic attacks followed, and death in six months. The bullet was found in the left hemisphere. This was an injury of the correlative visual region. (Opp. p. 616.)

ing this review of pathology in the present edition, as it would enlarge the volume too much and delay its publication without corresponding advantage, as this volume will circulate beyond the bounds of the medical profession in the hands of many to whom pathological and medical details would neither be necessary nor interesting. Their chief value would be to physicians, to whom such evidences are desirable when they are not familiar with the decisive experiments on which the science is based.

I cannot, however, entirely omit the pathological demonstration which to a philosophic thinker is quite important as illustrating Sarcognomy in disease. Hence I now prepare a brief *résumé* of the subject, showing in a concise and imperfect way that all parts of the body illustrate Sarcognomy in disease as well as in health.

I shall pay special attention at first to the sympathies of the surface of the brain with the surface of the body, which is the cardinal doctrine of experimental Sarcognomy.

SYMPATHY OF THE BRAIN AND SKIN.

Owing to this sympathy a warm glow of the skin is the condition most favorable to cerebral activity, and hence in warm climates the warmth maintained on the surface favors the early development of the brain, leading to early marriages, and produces the higher spirituality and capacity for psychic marvels which are remarkable in tropical climates.

In colder climates the nervous system is less active and predominant and the muscular system more powerful. The highest social enjoyment is in warm apartments, while the coldness of out-door life is more favorable to the muscular system than to the brain. Hence northern climates produce muscular and hardy races, while southern climates produce delicacy and refinement without muscular energy or industry. Their life is happy in a quiet way, and they are generally deficient in practical energy. The antagonism of the brain and muscular system is illustrated every year by the indolence produced at the approach of warm weather.

The electricity which gathers upon the skin in a dry atmosphere is highly favorable to the activity of the brain, while the free discharge of electricity from the surface in a moist atmosphere diminishes the cerebral energy. The dry, electric atmosphere of the mountains is more favorable to genius than the seaside. The contact of water with the skin is still more exhausting and cannot be endured long without injury. Hydropathic treatment has often produced injury by overlooking this tendency.

The warm woollen and silken clothing of civilized nations maintains

a degree of warmth and nervous life in the skin which sustains the activity of the brain, which is less apparent in the savages of cool climates, as neither their clothing nor their dwellings keep them very warm. The Indian, though superior in brain development to the negro, who comes from a warm climate, has not as active, excitable and emotional a brain.

When exposed to penetrating cold there is dulness and inactivity of the brain and entire nervous system, which gradually advances to an irresistible drowsiness, and thus proves fatal by overpowering the brain.

The normal action of the brain is promoted by cleanliness of the skin and the clothing, and very much oppressed by fou clothing of a dense texture which retains exhalations. The killing of rabbits by covering their bodies with a coating of glue, suet and rosin, by French physiologists, is a very conclusive demonstration of this cerebro-cutaneous sympathy. The great oppression and debility which we feel from an excess of clothing is a similar illustration.

The character of the skin seems to be an index of the brain, of which we judge as it is mirrored in the countenance ; and the lowest type of brain development is found in company with the cold, scaly and insensible surface of the fishes and in the cold-blooded reptiles, whose cold skin excites our loathing. From the dulness of aquatic animals it is a long step to the brillance of the brain power of birds, whose surface is warmly protected by a feathery clothing. There is also no lack of mental activity in animals clothed with fur and wool. The rhinoceros, tapir, hippopotamus and elephant have a less active nervous system, though the large size of the elephant's brain gives it a high grade of intelligence.

This relation of the skin explains the superiority of Franklinism, which acts on the surface, over Faradism as a therapeutic agent, which penetrates the body. It leads us also to attach great value to woollen clothing, which maintains the most perfect condition of healthy vigor in the skin, and to dry friction on the skin as a hygienic measure.

This association of the brain and skin leads to the inference that eruptive fevers must have a special action on the brain, in addition to the febrile influence, which is itself debilitating and deranging as well as exciting to the nervous system. The cutaneous condition must affect the membranes of the brain, and thus produce an exciting and disturbing effect, according to the locality of the eruption. A critical report upon cerebral conditions in eruptive diseases would be valuable.

A good illustration of cerebral sympathies was furnished by M. Trousseau in reference to cerebral meningitis, the diagnosis of which

in the young subject, he says, may be aided by reference to the lungs and the skin. There is a peculiar sighing respiration — the child takes a long breath and remains without breathing from ten to fifty seconds, and then takes another deep respiration. The skin is *liable to be reddened by the slightest friction or pressure*, but this has no connection with fever. He stated that he had found this constantly in all cases of meningitis which he had seen for some time past. The quietude of respiration which he describes is like the physical tranquillity which belongs to long-continued mental action. There is so little use of the muscles that there is little need for breathing, and we can hold the breath for a long time after quiet, protracted study.

As healthy or unhealthy conditions of the skin affect the brain, so does the state of the brain react on the skin, in cerebral inflammations which develop superficial heat and depressed conditions which debilitate the skin. Hence treatment of the skin relieves the brain and treatment of the brain relieves the skin. Beard and Rockwell say that herpes, prurigo and eczema yield rapidly to central galvanization, which is treatment of the brain.

The skin is the chief seat of calorification and regulator of temperature. Caloric vitalizes the brain as cold suppresses its action. Thus the skin modifies cerebral conditions. But Calorification (with which the skin is associated) appears on the cerebral chart to be adjacent to the throat and to the region of mental derangement. Hence the hot skin of fever excites and disturbs the brain, and fever or excessive calorification becomes associated with throat diseases and cerebral disorder.

On the other hand, there is a great enfeeblement of the skin, producing cold, clammy and profuse perspiration, when the brain power is undermined in various diseases. We observe this in the colliquative night sweats of consumption, in the relaxed perspiration which precedes death in apoplexy, and in many examples in which the perspiration is not beneficial to the disease. It is never beneficial when it proceeds from cerebral debility; on the contrary, it is an exhaustive condition. From investigations instituted by M. Sassicki he deduced the conclusions that "sweating decreases the power of the gastric juice and diminishes its acidity both relatively and absolutely. The stronger the perspiration the more the digestive power and the acidity are diminished." Hence the necessity for vinegar, salt and condiments in diet in summer.

Whether it is the cause or (more probably) the effect of cerebral prostration, it is a sure sign. In typhus fever Dr. Henderson (see *Medical Gazette*, July 24, 1846) has stated that "copious perspiration in typhus is generally a symptom fraught with danger, and accord-

ing to his experience such cases seldom recover, especially if the sweating is accompanied with quick pulse." "I have noticed (he says) a favorable change coincide with the occurrence of copious perspiration, but never a total cessation of the febrile symptoms. In the great majority of instances, instead of copious perspiration in typhus coinciding with symptoms of amendment, it happens that it ushers in or accompanies a state of hopeless prostration, stupor, hurried breathing and increased frequency of pulse."

A case of sweating sickness was related by Dr. Laurie in the *Monthly Journal* of October, 1846, in which the patient, an active man of 60, was seized with bilious vomiting and pain in the umbilical region, and the same night awoke with profuse perspiration for six hours, which saturated his body linen, bedclothes and mattress; after this he was seized with an ague fit, cramps and abdominal pain, and when visited was found in a state of collapse, with husky, feeble voice, cold extremities and intense thirst, some vomiting and purging. He was relieved by stimulants. The connection of "immense" perspiration with his condition of collapse is worth noticing.

The intimate sympathy of the brain with the skin is shown in the facility with which consciousness is abolished by a shock of static electricity which traverses the surface. Dr. Franklin sent a discharge from two Leyden jars through six robust men, "they fell to the ground and got up again without knowing what had happened; they neither heard nor felt the discharge."

"Some time ago (says Prof. Tyndall in his lessons in electricity) I stood in this room with a charged battery of fifteen large Leyden jars beside me. Through some awkwardness on my part I touched the wire leading from the battery and the discharge went through me. For a sensible interval *life was absolutely blotted out*, but there was no traceof pain. After a little time consciousness returned. This may be regarded as an experimental proof that people killed by lightning suffer no pain."

The superior importance of *surfaces* in physiology is illustrated by the assertion of Lallemand that he has never observed delirium in simple inflammation of the substance of the brain, but whenever it has appeared there was an inflammation of the arachnoid. The arachnoid inflammation is generally prior to the cerebral.

Dr. Thomas Dowse, in a recent work on massage and electricity, says of the secretions of sweat when the skin is pale: "I assure you they are more common than is usually supposed, and it is indicative of a want of tone and a low degree of vitality of no small importance; it is always associated with a form of nervous exhaustion — understand me, it is essentially neurotic, and is not unfrequently followed

by organic changes in the nerve centres, leading to mental disturbance, diabetes, albuminuria. There is a form of hyperidrosis called by Eulenberg "epileptoid sweats." I think this form is very correctly named. A man will suddenly, after walking a few yards, and without any apparently exciting cause, break out into a profuse perspiration, become pale, hungry and faint, and lose resisting power, without vaso-motor dilatation or constriction; indeed, it seems as though, for the time, the dilator and constrictor fibres were both paralyzed.

"The normal secretion of sweat diminishes along with other derangements of nutrition of the skin, in some nervous diseases, and in degeneration of the motor ganglia of the anterior horns of the spinal cord. In some cases the nutrition of the skin is interfered with in a peculiar way, so that it becomes glossy and has the feeling and appearance of parchment."

"The man who sweats profusely, when his fellows under the same influences do not do so, is more liable to functional and even degenerative changes than others."

Speaking of the connection between torpor of the skin and torpor of the mind, he says:—

"The patients are usually depressed, melancholic, and suffer from nervous exhaustion. They are also remarkably insensible to the Faradic and galvanic currents, and this insensibility seems to be in proportion to the obtuseness of their mental powers; but it is interesting to note that as their mental condition improves, so their sensibility to Faradism gradually returns to its normal state."

"I have noticed that this torpidity of intellectual power is associated with increased physical resistance to the Faradic current and to the general sensibility of the skin. Of course, in locomotor ataxy and general paralysis of the insane, this is a marked feature; but I am attending now to cases where in most instances the patients are told that there is nothing at all the matter with them, and although we see that physical resistance is increased, we invariably find that moral resistance (will resistance) is below the normal standard."

"We know that in the domain of intellectual activity proper, sensitive impressions are of the utmost importance; tactile impressions are specially destined to provoke reactions in the intellectual sphere. These impressions unquestionably play a very important part in the cerebral activity (or otherwise) of a man's individuality. 'We all know (says Dr. Luys in his work on the Brain and its Functions) how fine, delicate and sensitive is the skin of women in general, and particularly of those who live in idleness and do no manual work; how their sensitive nervous plexuses are in a manner exposed naked to exciting agencies of all sorts; and how, from

this very fact, this tactile sensibility, incessantly awake, and incessantly in vibration, keeps their minds continually informed of a thousand sensations that escape us men, and of tactile subtleties of which we have no notion. Thus, in the idle women of society, and men with a fine skin, mental aptitudes are developed and maintained in the direct ratio of the perfectionment and delicacy of the sensibility of the skin. The perfection of touch becomes in a manner a second sight, which enables the mind to feel *and see* fine details which escape the generality of men, and constitutes a quality of the first order, *moral tact*, that touch of the soul, as it has been called, which is the characteristic of organizations with a delicate and impressionable skin, whose *sensorium*, like a tender chord, is always ready to vibrate at the contact of the slightest impressions."

"Inversely, compare the thick skin of the man of toil, accustomed to handle coarse tools and lift heavy burdens, and in whom the sensitive plexuses are removed from the bodies they touch by a thick layer of epithelial callosities, and see if, after an examination of his intellectual and moral sensibility, you are understood when you endeavor to evoke in him some sparks of those delicacies of sentiment that so clearly characterize the mental condition of individuals with a fine skin. On this point experience has long ago pronounced judgment, and we all know that we must speak to every one in the language that he can comprehend, and that to endeavor to awaken in the mind of a man of coarse skin a notion of the delicacies of a refined sentiment is to speak to a deaf man of the deliciousness of harmony, and to a blind man of the beauties of colors."

"In the facts we have already cited respecting the pathogenic influence exercised by certain anæsthetics upon the genealogy of certain forms of delirium, we should add as a complement the following observations reported by Dr. Auzony, which clearly show what a curious influence sensitive impressions may have upon psycho-intellectual phenomena in general.

"The case was that of a young man, clever and rational, who suddenly became undisciplined and rebellious to the utmost extent, and gave himself up to the worst tendencies, even to the compromising of the peace and honor of his family. Examination showed that he was completely *anæsthetic*. During his stay in the asylum he successively experienced several phases of anæsthesia, of which the appearance manifestly coincided with the return of his worst instincts. When sensibility reappeared in the skin, moral dispositions contrary to the preceding were observed to return in him, together with a very clear consciousness of his situation."

"Some years ago I met with a case in which a young lady, aged

about 23, stated that she was totally unconscious of *sensations* of any kind. In all her life she had never experienced pain, 'had never had a headache.' Heat or cold, sunshine or fog were all the same to her; nothing seemed to affect either her health or her spirits; she was uniformly calm, easy going, imperturbable. She was married about a year after I first knew her, and to a lady friend whom she had known intimately in their days of school-girlhood, and who met her six or seven years afterwards, she said that her peculiarity had in no way changed. She was still insensible to pain, and during her three pregnancies had suffered nothing, even the critical periods of labor having been passed through without any physical distress. She was highly educated, musical, and pleasant in society; the only abnormalty that her friend detected in her was her extreme coldness of manner in her own home, to her husband and children; to the latter especially she was harsh and unreasonably exacting, and appeared totally devoid of the faintest rudiments of natural affection.

"A case is known to me at the present time in which a young man, aged 21, exhibits entire insensibility to the sensation of pain. He is quite willing at any time to demonstrate this to his friends on their expressing incredulity on the subject, performing for their entertainment a variety of unnatural feats, such, for instance, as running a darning needle through a finger or thumb, in at one side and out at the other, or pinning his hands to a table by means of four stout needles, driven through the thin part of the flesh extending between the fingers and thumb. About two years ago he underwent an extremely severe operation on one of his eyes, refusing to be placed under chloroform, and taking a conscious interest in the movements of the surgeons throughout the whole operation. I may mention that a very strong galvanic current produces but little impression upon him. He is a young man of peculiar temperament, given to the exhibition of fits of violent anger and passion on quite inadequate provocation, which are succeeded by great sullenness and silence for several hours. He sometimes shows destructive tendencies, and will wantonly smash and spoil articles of value."

Dr. Renaudin relates the case of a youth in whom a degenerate mental condition was produced by anæsthesia of the skin. He was doing well at school, when his mental and moral powers suddenly declined, and for unruly conduct he was expelled. Dr. Renaudin found an insensibility of the skin, which he regarded as the pathological cause. This anæsthesia was intermittent, and when it was absent "he was docile and affectionate. When it reappears his evil instincts return, and we have reason to know they might have led him even to murder."

As eruptive fevers concern the skin they affect the brain, while, in return, inflammations at the surface of the brain affect the skin. Hereafter students of Sarcognomy may observe how the locations on the brain and body correspond. Inflammation of the dura mater and arachnoid is, according to Dr. Thomas Watson, "marked by pain of the head, by *fever*, and by rigors which intermit, and so regular are the intermissions that the practitioner may be tempted to believe that he has got an aguish patient." In encephalitis he recognizes "a parched and dry skin, a frequent and hard pulse, flushing of the face and preternatural sensibility to external impressions."

On the other hand, in the opposite condition of delirium tremens, when the brain is exhausted, demanding stimulants and tonics, "the skin is perspiring and most commonly the patient is drenched in sweat," the condition which "commonly accompanies prostration of the nervous system." In acute hydrocephalus, he says, "the face is flushed, the eyes are brilliant," "there are pain and tenderness of the abdomen," "the disease is very like an attack of continued fever."

In small pox, says Watson, there is "nausea and vomiting, *headache*, sometimes *wild delirium*, sometimes convulsions." The condition of the brain in bad cases affects the lungs and in fatal cases, says M. Roger, the lungs are frequently found gorged with blood.

In erysipelas, says Watson, "generally there is some *wandering of the mind*, especially at night; and in bad cases there is much *delirium*, and at length *complete coma*." "When death takes place and the head is examined, serous fluid is usually discovered beneath *the arachnoid* and in the *cerebral ventricles*, and the veins of the *pia mater* are turgid." Inflammation of the brain, he says, is apt to follow when the erysipelas deserts the surface. "The extension of the inflammation, the supervention of *delirium and coma* while the external inflammation continues, are of common occurrence. This, then, is one way in which erysipelas is accustomed to prove fatal, by effusion *within the head* and coma."

The close sympathy of the brain and upper portion of the lungs is such that skin diseases which affect the brain severely must also affect the lungs. In fatal cases of measles, according to Prof. John Bell, "the marks of pulmonic alteration are generally clear, and next are those of inflammation of the bowels and the *brain*."

"In scarlatina the morbid alterations are chiefly sanguineous *congestion of the brain*, serous membranes, spleen, plates of Peyer and internal follicles. *The brain* exhibits increased vascularity, with opacity of the arachnoid membrane and *effusions* of serous or turbid fluid between it and the pia mater." (Bell.)

There is a close analogy in the exanthemata: measles, scarlatina and small pox have similar conditions, affecting the brain and lungs. In scarlatina anginosa with a florid eruption, according to Watson, "many of the patients die apparently from *inflammation or effusion within the head.* They have *violent headache*, with *furious delirium*, which is followed by *coma* and death." The skin in this case differs widely from the skin of typhus.

Dr. Cathcart Lees, in the *Dublin Medical Press* of July, 1850, speaks of a dangerous form of delirium in scarlet-fever, resembling in some respects that of delirium tremens. Dr. Gregory of London speaks of this delirium in his lecture on eruptive fevers, saying "delirium often of a fierce and unrestrainable kind seizes the adult. I have seen two patients in this disease, in the most raging frenzy, jumping out of bed naked, and dying on the floor of the chamber." Dr. Lees describes cases in which the patient continues wild, noisy and sleepless, in which life can be saved only by procuring sleep. Dr. H. Kennedy of Dublin says, in his work on scarlatina, that the delirium is purely nervous, as "when patients died with well-marked head symptoms, no morbid appearance was found in the brain to account for them."

This condition of the brain is overcome by soothing measures on the skin — inunction with bacon fat or other oily matter applied by a healthy hand. "With rapidity (says Dr. Schneeman) the most painful symptoms of the disease are allayed, *quiet, sleep, appetite, and good humor return*," under this treatment.

The wild insanity of scarlatina is due not only to the condition of the skin but to the affection of the throat. Affections of the throat — scarlatina, diphtheria, cynanche, etc. — concern a region adjacent to the insane tendencies of the brain and therefore liable to producing insanity, dementia and paralysis.

The conditions of the brain and skin cling together in close sympathy. Inflammation of the brain produces a hot, sensitive skin, and the condition of the brain in typhus is indicated by the very peculiar mordant heat of the skin mentioned by authors, which gives a peculiar sensation to the touch. It is also, according to Bartlett, "very generally attended with a peculiar and characteristic eruption upon the skin. The name of the disease has often been derived from this circumstance; hence it has been called petechial fever, spotted fever, maculated fever, and so on." The spots are often purplish and almost black, corresponding to the oppressed condition of the brain. Dr. Bell says, "the most characteristic symptom of typhus is the exanthematous eruption," and Dr. Copland expresses a similar view — that this eruption is as characteristic of typhus as their peculiar

eruptions are of measles and scarlatina. The morbid condition of the skin is shown by its "pungent and offensive" odor, which "increases as the fever progresses, and toward the termination of fatal cases, often resembles the fetor of putrid animal matter." The changing conditions of the skin correspond with those of the brain which is the seat of the fever — florid at the beginning and little offensive in odor, dark, petechial and offensive at the close, or improved as the disease subsides. The "calor mordicans" (pungent, biting heat) is usually more intense during the first week, but declining afterwards as the pulse and the patient decline — the vital force being insufficient to maintain the temperature and the vitality of the skin declining with that of the brain.

The medical profession has been much embarrassed in drawing the distinction between typhus and typhoid fever, which Sarcognomy explains,— typhus being properly a disease of the brain, while typhoid is essentially located at the hypogastric region of the ileum and therefore identified with a region of the body which is not only feverish in tendency but tends to derange the brain and affect the skin. The diseases are therefore so analogous and have so many similar symptoms that an absolute distinction is not possible, as they run into each other, and the older authors were not far wrong in taking them as one. Both illustrate the sympathy of the brain and skin and they affect both.

We may then maintain that the skin and brain go together in health and in disease, and, as Sarcognomy shows the exact location of these sympathies, it gives us command of the entire brain and of its subdivisions for therapeutic treatment.

But the skin, being located on the body, sympathizes with the subjacent organs, enabling us to affect alike the bodily physiology and cerebral psychology.

This was well explained by that able physiologist, the late Professor Macartney, in his most valuable work on inflammation, as follows:—

"It is a law of the animal economy that internal and external surfaces that are opposed to each other are more disposed to sympathize than tissues that are continuous. All local and superficial injuries, as inflammations of the skin, are liable to create an inflamed state of the nearest serous surface without involving the interjacent tissues. I have seen this opposite inflammation set up from burns and scalds, superficial military punishment, the irritation of a blister, tinea capitis spreading to the face, and erysipelas. It deserves remark that these internal inflammations have a peculiar character. They keep pace with the external source of irritation. The surface of the serous

membrane is crowded with red vessels which do not, however, pour out serum. The parts are not conjoined by coagulable lymph, nor is there any tendency to the formation of pus. The constitution sympathizes more with inflammations of the serous membranes thus produced, and in a different manner, than with those arising originally on the serous surfaces. Instead of the inflammatory symptomatic fever, we observe prostration, anxiety, perturbation, and in severe cases there is delirium. The result is not unfrequently fatal."

These remarks seem to apply to irritations affecting the abdomen, and the prostrating effects correspond with the laws of Sarcognomy, but I present them merely to show the power of the skin over subjacent structures and the consequent advantage of cutaneous treatment by the hand or any other means.

PULMONARY SYMPATHIES.

The general sympathy of the THORAX and BRAIN amounts to a complete correspondence of analogous surfaces, — the superior, inferior, anterior and posterior of one corresponding with the same in the other, as we shall find by examination. But there is also the special relation of the respiratory organs to respiratory centres, which I locate at the Pons Varolii, and which on my bust are marked around the nostrils and mouth. The entire subjacent tract maintains a close relation with respiratory conditions, as manifested in the red line of the anterior gums in pneumonia and their condition in consumption.

It follows that all affections of the nostrils, mouth and throat affect the lungs. ASTHMA affords a fine illustration of this. In the Medical Congress at Weisbaden in 1885, Dr. Hack gave his experience of nearly six hundred cases of asthma, in all of which he professed to discover a reflex neurosis, of which the nose was invariably the centre, the treatment of which was indispensable.

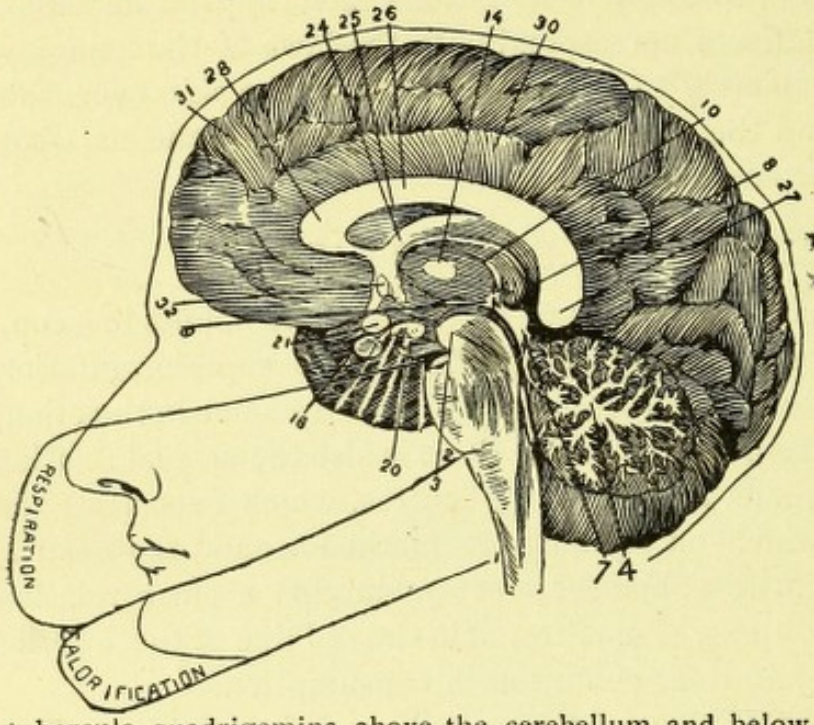
It follows from these principles that the organs of respiration may be treated efficiently by treatment of the nose, and according to the *New York Medical Times* Dr. Goldsmith has treated whooping-cough successfully on this principle. He injected a solution of salicylic acid (1 to 1000) or corrosive sublimate (1 to 10,000) into the nose every two hours, six times the first day and four times the next day, which generally effected the cure.

Brown-Sequard stated in one of his lectures that coughing and sneezing can be prevented by pressure on the lips in the neighborhood of the nose. This is on the expiratory tract, concerned in coughing and sneezing. But I think the result depends somewhat on the sensitive impressibility of the subject.

We know that a little snuff or capsicum or other irritant applied

to the nostrils will produce sneezing, and even a little whiff of cool air may have the same effect.

The complicated diseases produced by CATARRH — the severe affections of the lungs, the brain and the entire constitution — are familiar facts. A medical pretender has even undertaken to cure all diseases by application in the nostrils of his panacea.



This engraving represents the internal face of the right hemisphere of the brain, divided exactly on the median line from the left hemisphere. It is introduced to show that in operating through the face by the hand we impress the Pons Varolii when we operate on what is marked on the chart as the respiratory region of the face. The Pons Varolii has been shown by pathological observations to be the seat of the respiratory function. In stimulating Calorification through the chin we operate on the medulla oblongata which occupies the space from 1 to 2. The prominence above 2 is the Pons. The corpus callosum which connects the two hemispheres is the arch of white nervous substance indicated by the figures 28, 26, 27. The divided cerebellum is indicated by Fig. 4. Fig. 7 refers to the tubercula quadrigemina above the cerebellum and below the corpus callosum, in which the optic nerve originates. The optic nerve is indicated at 21 — the oculomotor at 20. The anterior commissure (about as large as the optic nerve), which is cut as it passes to the left hemisphere connecting the two regions of Sensibility, is indicated at 32. The septum lucidum, 25, is a thin vertical lamina below the corpus callosum; the fornix, 24, is a layer of fibres passing back from the anterior commissure, and dipping downward; the pineal gland, 8, 9, 10, is a small nervous body lying on the tubercula quadrigemina; the gyrus fornicatus, 30, and the interior frontal convolution, 31, are the seat of some of the higher faculties. This group of five — the septum, fornix, pineal gland and two convolutions — are in a realm of mystery. No investigator yet — not even Gall and Spurzheim — has pretended to any knowledge of their functions, with which I have been familiar many years. I shall make the first published exposition of their functions in the Syllabus of Anthropology. There is not sufficient interest in such knowledge at present to induce its publication except as a portion of a systematic treatise.

The production of asthma by morbid growths and conditions in the posterior nostrils, and its cure by extirpating the morbid growths, is now well established by cases in practice. A case communicated to Dr. J. E. Schadle of St. Paul by Dr. John N. Mackenzie of Baltimore is worth mentioning. He says: "A man consulted me for violent attacks of asthma which compelled him to give up work entirely. Irritation of the sensitive area invariably produced an attack. He had two large posterior hypertrophies, both of which I removed with the cold wire-snare. *At each revolution of the nut and tightening of*

the wire he was seized with a violent paroxysm, so threatening that I was fearful that the operation would have to be suspended. Seeing, however, that he came out of each attack with safety, I screwed the loop slowly home at long intervals, and finally cut through the masses. Relief was immediate, and that night he slept without his asthma for the first time in several years. No other treatment was used beyond the ordinary spray. Two years or more have passed and the patient has not returned."

The close relation of the respiratory tract to the intuitive and intellectual regions of the brain is verified in the unfavorable effect of diseases of that region on the mind. Dr. R. P. Lincoln, of New York, speaks in the *Medical Record* of a "growing stupidity" from the morbid growths of catarrh in the posterior nasal region, which he relieved by galvano-cautery.

Further illustrations are not necessary. I would merely mention that it is easy to show by nervauric experiment or by electricity that respiration may be affected through the respiratory tract at the nostrils and mouth, the external localities through which we reach the Pons Varolii; consequently the structures that intervene exercise a controlling influence on respiration. Hence the appearance of the gums in pneumonia, and the irritation and feverishness of children in teething. *Herpes labialis* was mentioned by Dr. Tyrrell as a constant symptom in an epidemic of influenza at Sacramento.

The direct sympathies of the LUNGS and BRAIN were illustrated in Dr. S. Rogers' description, in the *Madras Journal*, of the effects of sunstroke in soldiers. The patients, he says, "complained of difficult breathing, with a sense of tightness and oppression about the chest."

Kussmail and Tenner, in their experiments on rabbits, found that when they checked the circulation in the brain the respiration was much reduced — in one case from 135 to 18, and became snoring.

Purgation, which gives relief to the brain, also relieves the lungs and improves the freedom of respiration.

The close connection of the base of the lungs and base of the brain is shown in all violent exercises and passions, which produce deep respiration by the diaphragm, while the gentler emotions produce expansion only of the upper part of the chest.

CONSUMPTION ranks above all diseases in the hopeful and spiritual tendencies of its victims. The favorite location of phthisis is in the upper portion of the lungs, especially on the left side; thus occupying the region associated with Hope, Love and Conscientiousness, in front, extending laterally into Cheerfulness and Tranquillity. The hopeful spirit and refined emotions of consumptives, before the disease has destroyed the upper portion of the lungs, contrast with the gloomy

effects of hepatic disease, and the selfish, irascible temper which so often appears in gout and rheumatism.

Coolness associates with the lateral posterior surface of the chest, and hence, as the disease advances, chilly feelings frequently appear. My colleague, Prof. I. G. Jones, who was himself a victim of the disease, says: "Chilly sensations will frequently be observed, even during the warmest weather." This coolness is also a characteristic premonitory symptom of pneumonia. Contrary to the common impression, the general tendency of the thorax is cooling rather than heating. Its heating influence belongs only to its basilar region — to *depth* of respiration.

The hectic flush of the cheeks occupies a region indicative of nervous sensibility and debility.

The exhaustion of the vital force of the brain by consumption results in the profuse perspiration which belongs to nervous exhaustion and appears in night sweats when the brain has the least energy, and which appears still more profusely in fatal apoplexy. One of Watson's patients reduced the perspiration by sitting up at night, thus maintaining the activity of the brain. The great mortality of consumption is due to the fact that the seat of the disease is the region antagonistic to Vital Force.

In BRONCHITIS the portion affected is that which corresponds to the intellectual organs of the front lobe, and hence frontal headache is a regular symptom. Dr. Elliotson says of the headache of bronchitis, that patients almost always describe it as a *splitting* headache, and sometimes there is drowsiness. There is great congestion in the head. In influenza, as described by Watson, which is similar to bronchitis, "the patient is chilly and perhaps shivers; presently headache occurs and a *sense of tightness across the forehead.*" According to Prof. Bell, when the pain in the forehead is not soon relieved, feelings of great depression are complained of; the pulse becomes weak as well as quick, the brain is disturbed in its functions and the muscular strength is much reduced. All this is the characteristic tendency of the front lobe, which in excitement utterly exhausts the vital forces.

"The transition from this stage to death (says Prof. Bell) is soon made, especially in those cases which have been neglected from the outset. A remarkable feature of the worst form of bronchitis is the rapidity with which the collapse and the symptoms of extreme prostration and debility succeed to high fever and well-marked local excitement. The whole course of these fatal cases is sometimes wonderfully rapid — death ensuing within two days from the commencement of the attack."

In the moribund condition, according to Dr. Elliotson, "the pulse becomes weaker and softer, and, at the very last, vermicular; the surface becomes blue, and the forehead and skin are bedewed with a cold, clammy perspiration." The cough of chronic bronchitis, according to Prof. Bell, "wastes the body and reduces the strength." English writers speak of the great prostration of the patient in influenza, and Watson speaks of a greater loss of life by influenza than by cholera. The use of the lancet in such cases was destructive. The whole history of bronchitis illustrates the anti-vital tendency of the front lobe, with which the bronchial region is associated, and which participates by sympathy in the disease. Andral reports a case of bronchitis, ending in death from marasmus and debility, in which he found a "sero-purulent infiltration of the subarachnoid cellular tissue of the convexity of the cerebral hemispheres, and the lateral ventricles were distended with serum." Elliotson and Bell recommend cupping between the shoulders, which is the location indicated by Sarcognomy.

ABDOMINAL RESPIRATION. — The location of respiratory impulses on the abdomen and the sympathy thereby established with the lungs is illustrated in disease. Purgation is an important part of pulmonary treatment. Prof. Bell insists on purgation in bronchitis — "free and early purging," — as necessary. So great is this sympathy that the faculty have often been puzzled by bronchitis of abdominal origin. There is a sympathetic organic cough described by Broussais, which he says is relieved by treatment of the gastritis. Gastritis was his hobby, but it was nothing more than gastric irritation, and such cases are distinguished from true bronchial disease by the absence of local symptoms in the chest. Bell mentions a liability to bronchitis as a consequence of gastro-enteritis. The liability to cough from intestinal irritation is shown in the cough produced by worms. Dr. Bell mentions a case of this kind in a girl, in whom the pulmonary symptoms (cough and remittent fever) were produced by worms and cured by a vermifuge. Autumnal remittent fever is sometimes associated with bronchitis — the symptoms alternating in the chest and abdomen. The special locality productive of the cough has not been designated by medical authors, but Sarcognomy locates it around and below the umbilicus, the severest cough being produced below. A similar cough may be produced in the impressible at that locality.

The great sympathy of the LUNGS and SKIN is a necessary inference from the sympathy of lungs and brain. Bronchitis is one of the dangers of scarlatina and small-pox.

The front lobe being the seat of the most delicate and extensive sympathy and sensibility, the bronchial region necessarily possesses

the same character, making us acutely susceptible to all atmospheric or epidemic conditions. "Not one man in ten thousand (says Watson) passes a winter without having a cold of some sort."

PNEUMONIA illustrates Sarcognomy. The hyperæmia of the chest produces a corresponding hyperæmia of the brain. Its first approach in myself, in a cold, produces an abundant and pleasant action in the entire brain. But mental conditions are but little noticed in pathological reports.

The tendency of the thorax is to produce a full and rather strong but steady pulse, as that of abdominal irritations is to produce a feeble and rapid pulse. The former tends to coolness, the latter to fever; and this coolness or chilliness is a premonitory symptom of pneumonia for two or three days.

The inflammation of pneumonia affects the brain, and produces severe headaches; the determination to the anterior part of the brain produces flushing of the cheeks, which are supplied from the same artery.

In a weak constitution there is determination to the head, coldness of extremities and inaction of bowels and kidneys. Majendie describes a dangerous pneumonia as showing a vacant stare, ideas wandering, general debility and nasal hemorrhage. As the mouth and nostrils correspond externally to the respiratory tract in the brain, we find, according to Prof. Bolling of Nashville, a brick-red deposit on the gums in severe cases. Prof. Fredricq, a European writer, has observed the same thing in consumption (*Revue Medicale, 1848*). Prof. Jones has observed that the lips break out with fever blisters.

Infants with pneumonia are disposed to breathe through the mouth instead of the nostrils. Barthez and Rilliet speak of gangrene of the mouth as a concomitant of pneumonia in children.

Delirium is one of the most frequent accompaniments. "In children (says Ranking) it is frequently one of the first symptoms." Hourman and Dechambre say that delirium usually accompanies pneumonia in the aged pensioners of La Salpetriere. Delirium, according to Bell, is a symptom of great danger. Pneumonia in patients worn down by disease results, according to Laennec, in coma and death. Dr. Condie observes that head symptoms are more frequent in children when there is bronchitis co-existing.

The sympathy of the brain and skin causes the pungent heat of typhus; pneumonia by affecting the brain produces the same result on the skin. "Of all the symptoms of pneumonia (say Drs. Bright and Addison) the most constant and conclusive, in a diagnostic point of view, is a pungent heat of the surface. By this symptom alone the first stage of pneumonia has been repeatedly pronounced to

exist, before asking a single question or making the slightest stethoscopic examination of the chest."

The skin is usually hot and dry. A profuse perspiration (indicating brain impairment) has been found by Dr. Bell to indicate frequently a fatal termination, with the cold skin and profuse sweating in which powerful stimuli produce very little effect, and death comes by exhaustion.

As the functions of psychic organs associated with the thorax are antagonistic to those associated with the abdomen, it follows that the thoracic inflammation arrests the abdominal functions, the kidneys, stomach and bowels being interrupted. Hence a vigorous emeto-cathartic at the beginning is a very effective measure.

Vigorous catharsis is recognized as necessary by the best practitioners, as it is for affections of the brain, with the additional reason that it unloads the respiratory abdominal tract and produces freer respiration.

PLEURISY.— The sympathetic relations of pleurisy, according to Sarcognomy, differ from those of pneumonia, as the pleura has not so close a relation to the brain. It is a more inflammatory and less congestive affection and does not usually occupy so much of the thoracic surface. It may reach the axilla, the clavicle, shoulder, sternum, mediastinum or whole front of the chest, and margins of false ribs, but usually occupies a smaller area. Its most usual location is at and just below the mammæ, and as the mammæ are in close sympathy with the womb a pain in this region is sometimes a symptom of uterine disease. The womb and mammæ are both associated with the sentiment of love.

The connection of pleurisy with uterine conditions is inevitable when it occupies this position. Dr. Bell recognizes pleurisy as one of the most frequent complications of puerperal fever. Cruveilhier speaks of puerperal pleurisy as occurring epidemically, and mentions a pleurisy which attacks females just before delivery. At La Maternité he was accustomed to examine and percuss those in whom feverish symptoms were marked. He says the prognosis of puerperal pleurisy is bad, few of those attacked surviving.

When the pleurisy attacks the inferior surfaces, the results are unpleasant — hiccough, nausea and vomiting, and sometimes jaundice, may ensue. All basilar surfaces have a depressing, exciting and unpleasant tendency.

When the disease runs across the front, below the mammæ, it affects a region of sensibility, excitability, imagination and morbidity, producing an effect approximating insanity, which was well described by Cleghorn in his "Diseases of Minorca," who portrays the wild

excitement, dreams and ravings of the patients in this disease, when the inferior and anterior portions of the chest were affected. The symptoms are very different and much more quiet when the upper portion of the chest is involved.

LARYNGITIS relates to the brain rather than the body. Cerebral science shows that the tendency of such a disease is to produce excitement, restlessness, nervous or mental exhaustion and a lethargic tendency, all of which are verified in its history. In severe cases there is high fever, disturbed respiration, dry, hot skin, great restlessness and a dull, drowsy, almost comatose condition. Its mortality (given by some as fifty per cent) is due to its exhaustion of the nervous system, similar to that of diphtheria — such is the tendency of the under-jaw region.

That the larynx corresponds to the location of Amativeness just below the medulla oblongata, would imply that its diseases would interfere with the sexual faculty. The relation, however, is better established by the fact that sexual puberty causes development of the larynx and voice and that all sexual irregularities affect the voice.

SYMPATHIES OF THE HEART.

The HEART affords a clear illustration of Sarcognomy in its diseases and excitements. Its form indicates that its superior lateral and inferior surfaces correspond with similar surfaces of the brain, but the verification of this would require much minute pathological research.

A remarkable illustration of the character of the different regions of the heart has recently been presented by McWilliam in the *Journal of Physiology*, showing that the superior region has the same moderating influence upon the heart as the superior anterior region of the brain has upon all vital processes.

The inhibition or checking of cardiac activity has been heretofore ascribed solely to the pneumogastric nerve; but he shows that in mammalian hearts there is a distinct "inhibitory area on the dorsal aspect of the auricles, stimulation of which causes a distinct inhibition, as when the vagus itself is excited." It is by means of this locality, which contains many ganglia and nerve cells, connecting with the auricles and ventricles, that the inhibition is produced, for when it is made anæsthetic by the application of cocaine in a four per cent solution, inhibition no longer takes place by irritating the pneumogastric or the local area itself. Evidently, then, this portion of the auricles has the subduing power over the heart, checking the muscular energy of its inferior portion, the ventricles. We may also observe that the chief energy of the heart belongs to its more posterior portion, the

left ventricle, — a feebler action occurring in the more anterior or right side, which is also slightly superior, —and this right ventricle furnishes the material upon which the left ventricle acts, without which it would cease, as the anterior region of the brain furnishes the psychic material or impressions which rouse the posterior region, without which it would go to sleep. Thus the correspondence of the heart with the general pathognomic law of vitality is illustrated perhaps as nearly as the peculiar form of the heart allows. The law is apparent in all organs. The lungs have their gentler action above, and the tendency to consumption; but greater force below, sustaining violent exertions and tending toward inflammation. The abdomen has its soothing and sustaining functions above and its heating, expulsive, depressing influences below. The liver belongs to the base of the thoracic system, to which it gives its gloomiest influence, sympathizing with the pelvic base of the abdomen. The limbs as they descend from the trunk take on a more restless and violent tendency, sympathizing below the knee and elbow with the abdomen, but above with the thorax. The heart as a whole corresponds with its location.

Its interior position in the body, near to its inferior half and central to its superior region, corresponds to the location in the brain of the white fibres proceeding to the corpus callosum, and thus brings it into sympathy with the entire brain. Hence the heart responds to every cerebral action. All the posterior organs give it strength in various degrees, and all the anterior organs give it various degrees of softness, merging into weakness; and it is easy to demonstrate this by examining the pulse as the organs are excited. This was the class of experiments on Dr. Lane which I made in 1843, before a committee of Boston physicians, eliciting the remark from one of them that my experiments were "too perfect." It was demonstrated by a public experiment in the medical college at Louisville, Ky. The same thing is illustrated by every variation of the pulse under emotional or passional influence.

The close general relation of the heart and brain is more intimate than is generally believed. Failure of one produces prompt failure of the other. Spiritual consciousness sometimes continues when the heart seems at rest, but the brain does not act so as to produce any effect.

Advanced inflammation of the heart paralyzes the brain, and in the various stages of inflammatory development the effect on the brain is so great as to be mistaken for inflammation of the brain, causing the heart to be entirely overlooked. I have the records of about twenty cases of inflammation at the heart, in which this mistake was made.

Sir Thos. Watson says that an important symptom of pericarditis is "delirium, sometimes quiet but often wild and furious, not dependent upon any disease of the encephalon." "Patients laboring under rheumatic carditis very frequently become affected with delirium or violent mania, or stupor and coma, or convulsions, or all of these in succession, and you might suppose they were laboring under inflammation of the brain or of its membranes." This he regards not as a metastasis, but as a sympathetic affection. "Again and again, when death has occurred and the delirium had been extreme, no traces of disease have been discoverable within the skull, while marks of violent and intense inflammation were visible in the pericardium."

The prostration of the energies of the brain by this sympathy explains the quiet taciturnity of the patients, and the loss of courage, or expression of fear and alarm, which Bertin spoke of as a characteristic symptom of heart disease.

The feeble and passive conditions developed by advanced inflammation in pericarditis or endocarditis render the patient more impressible and susceptible of nervauric treatment, as I realized in my first experiments in 1841, when I relieved an alarming case of pericarditis by treatment upon the brain with the hand.

As a specimen of the cases in which pericarditis is mistaken for brain disease, I give an abstract of one reported by Dr. G. Burrows: "Boy at Christ's Hospital — restless, sleepless, delirious — pain in forehead — a convulsion on third day — coma and death on fourth day — all treatment directed to the brain. No disease found in brain — pericardium covered with a layer of lymph, and fibres of heart dark, soft and infiltrated with pus." How forcibly do such cases teach us the necessity of cultivating the psychometric diagnosis, which, with a rational practice, would have saved this life.

While the entire brain thus shares the morbid excitement and the prostration of the heart, it as regularly shares all its other conditions, rising in energy as the heart works vigorously, declining as the heart becomes quiescent, and sinking in total prostration as the heart is weakened and softened in continued fever. There is no other organ which by its position and relations thus corresponds with the entire brain, so as to represent the entire person, — as the heart is considered in popular language the representative of the entire character and purposes.

Other organs not occupying this central position have no such representative character, and in their excitement or irritation they operate in a one-sided manner to change the balance of the character. Thus below the diaphragm we have the liver, corresponding in loca-

tion with the tract at the base of the middle lobe (the lower or third temporal convolution) which develops the morbid, hypochondriac and melancholy influences in its anterior portion, and in its posterior, which approximates combativeness and business energy, promotes a certain force of character which has originated the popular idea of a bilious temperament, while the influence of its anterior portion has been ascribed to the hypochondria.

The stomach lies behind a region of sensibility, somnolence and nervous refinement, and hence associates with indolent pleasures and the social impulses (Adhesiveness) which lie between its anterior surface and its spinal control.

The hypogastric region is the source of calorification and typhoid fever — and the pelvic region the seat of the influences that derange the nervous system. The thighs are the seat of the greatest physical energy and most furious passions, the legs of pure animality, and the feet of mental prostration and dulness ; while, in opposition to all these debasing influences, the thorax, sympathizing with the upper half of the brain, maintains the dignity of human nature and produces the great man whose energies if the chest is developed upwards are directed to noble objects, but if its development be chiefly at the waist will have a selfish direction, — from which it is fortunate for the world's salvation that woman is comparatively free, her waist being charmingly small. The opposite character is seen in the gorilla, in which the base predominates over the summit of the chest.

Under the influence of malaria the human race degenerates, and the lank chest and drooping attitude proclaim its inferiority, as the expanded chest of the mountaineer proclaims his superiority and power of endurance.

Our consideration of the heart would not be complete without referring to the fact that the immediate source of its energy is found in the three ganglia of the neck. These ganglia lie in the sphere of the basilar region of the brain — the neck. All influences through the neck produce animal force and excitement. The thick neck is a familiar indication of animal force, passion and strong circulation. It has also been recognized as an indication of apoplectic tendencies, and very properly, too, for the great cardiac energy drives the blood against the brain with a force which becomes destructive.

The total number of cases of apoplexy from hypertrophy of the heart which Dr. Hope had observed exceeded those arising from all other causes ; whence he was led to coincide in opinion with MM. Bertin and Bouillaud that hypertrophy predisposes more strongly to apoplexy than what is termed the apoplectic constitution itself, and

that in most cases those who present the apoplectic constitution in conjunction with symptoms of determination of blood to the head are at the same time affected with hypertrophy of the heart. This opinion is strongly corroborated by the observation of M. Richerand, who states that his repeated examinations of the bodies of apoplectic patients have proved to his satisfaction that the excessive power of the left ventricle of the heart more directly tends to the production of apoplexy than the short neck and large head which according to most writers constitutes the apoplectic constitution.

In 132 cases, compiled by Dr. Burrows, of apoplexy and sudden hemiplegia, 84 were accompanied by diseased heart.

The famous physician, Cabanis, had three apoplectic attacks and died in the fourth. The left ventricle of his heart was an inch thick and three times the natural size

RELATIONS OF THE LIVER AND SUBJACENT REGION.

The neurological relation of the liver is with the base of the middle lobe, just over the cavity of the ear, extending forward and backward. When this region is small, the liver is usually inactive.

I am quite sure that with sufficient observation the connection of this inferior portion of the temporo-sphenoidal lobe with the abdominal organs would be demonstrated, even with the imperfect observation that exists. I believe illustrations could be found by any one who had sufficient time for research.

I have met with a good illustration in Prof. T. M. Rotch's report on Diseases of Children in *Boston Medical and Surgical Journal*, May 30, 1889. Dr. Rotch says: "A child aged nineteen months came under observation for subcutaneous nævus. This was incised, and two days later she contracted scarlet-fever. During convalescence the child was taken with high temperature and symptoms of peritonitis. She died two weeks later. A post-mortem examination showed no trace of peritonitis. Venous congestion was found in the anterior third of the under and outer surface of the left side of the brain, and a firm clot, the size of a walnut, in the temporo-sphenoidal lobe. The limitation of the clot was distinct and the brain substance around it was firm. It was apparently of recent origin. The left lateral sinus was filled in its posterior two-thirds by an organized clot obviously of some date. The symptoms in this case were entirely misleading, and apart from convulsions on the day of death, pointed strongly to peritonitis."

This is a clear demonstration that the temporo-sphenoidal lobe can affect the abdominal organs so far as to counterfeit the symptoms of active diseases.

The psychic relations of the liver are with the psychic qualities of the base of the middle lobe, the tendency of which is to depression of spirits, fretfulness, melancholy, hypochondria, irritability, apprehension, anger and mental disorders of that character.

The liver associates, by the laws of pathognomy, with the pelvic or hypogastric region, and thus co-operates with its calorific power and tendency to mental and nervous derangement.

The different portions of the liver have different psychic relations. The posterior portion associates, from its position, with the jealous, aggressive, combative tendencies. Hence the liver is greatly affected by the angry passions, and when we provoke a man greatly we are said to stir his bile. There is a gradation between the hypochondriac portion of the liver in front and the hostile portion at the back. All intense excitements in the liver disturb the mental serenity and clearness and may run to delirium.

The proximity of the liver to the location marked disease makes it a frequent focus of morbid action, and my professor of medical practice, whose lectures I attended in 1833-34, had a very simple theory that all disease depended on a congestion of the liver produced by weakened action of the heart, and was to be removed by hepatic purgatives, — calomel, aloes, and rhubarb. Dr. Wilson Philip says: "There are few local diseases of which the liver does not more or less partake." "Depressing passions often instantly derange its function, and seldom fail, if long continued, to affect its structure." "It is not uncommon for blows on the head to produce inflammation of the liver, an effect they rarely, if ever, produce on any other of the abdominal or thoracic viscera." It is generally enlarged by disease wherever located, and attains its greatest dimensions from active disease in hepatitis, and next to that, according to Piorry's measurements, in heart disease. In rheumatism, typhus, pneumonia, consumption, bronchitis and ague it is enlarged on an average fully one-third in its linear measurements on the right side.

The psychic association of the liver with the melancholic and deranging hypogastric region is illustrated by the anatomical connection, as the blood of the intestines goes by the portal vein to the liver. The reception of this degenerate blood from fecal regions and the prompt reception of liquids absorbed from the stomach (especially alcoholic) give to the liver a low vital condition, which causes other organs to sustain it, while it acts, like the ileum, as a scavenger.

The liver furnishes combustible elements to the blood, to maintain its temperature, and, like the pancreas, assists in digesting fatty and animal foods, which are calorific. In cholera its secretion is suppressed; the restoration of which indicates recovery.

The upper and lower surfaces of the liver have different relations, according to pathognomy. The upper surface has its relations upward with the brain and lungs, by which it produces a cough, a headache, or cerebral oppression. The lower surface relates downwards, producing nausea and extreme prostration (relating to Disease), sympathizing with the pelvic region of nausea. The difficult breathing and hurried respiration appearing in hepatitis are produced by the upper surface of the liver.

"A peculiar symptom of all forms of hepatitis (says Prof. Jones) is the great lowness of spirits, with a peculiarly depressed condition of the nervous energies, affecting the moral and intellectual faculties, so that the individual becomes morose and unsociable." In chronic cases he says: "A very striking and diagnostic symptom is the peculiar lowness of spirits and gloomy forebodings of the patient. Individuals of naturally buoyant and sprightly dispositions are often changed to gloomy, morose and desponding hypochondriacs. Those before cheerful and amiable become cross, crabbed and unsociable, — in short, undergo an entire change of manner, and apparently of character."

Dr. Philip says: "All affections of the liver produce depression of spirits, hence the name melancholy. In its organic affection, this symptom is generally more uniform; its secretion is also more uniformly deranged. In some cases the patient becomes more or less lethargic, the mind at times wandering, and the long-continued irritation of the liver occasionally gives rise to some of those states which dispose to the different forms of apoplexy. The headaches of bilious subjects every one has witnessed." Hydrocephalus he mentions as one of the serious effects of the liver on the brain. Another effect is difficult breathing and cough, which sometimes becomes permanent.

No severe disease of the liver can exist without affecting the brain. A diseased, yellow and atrophied condition of the liver was reported by Drs. Bamberger and Michly in women who were attacked with agitation and delirium and died comatose. The spleen in these cases was enlarged and softened.

Delirium tremens is one of the cerebral affections which are largely due to the liver. Dr. S. Thompson and Dr. Corf from extensive observation in hospitals maintain this view, and have cured attacks by vigorous dosing with calomel and cathartics, finding no need for opiates.

The tendency of the upper surface of the liver to affect the lungs and brain produces sometimes a pain under the right shoulder-blade. The affection of the head is most apt to appear near the median line and especially near the coronal suture. Some persons have professed to diagnose disease of the liver by finding a tenderness at that spot.

Jaundice, being a state of forced inaction of the liver, has very different symptoms from its active diseases. It may be produced by fright, mental anxiety or passion, and as a negative condition is not a serious affair; but jaundice produced by disease immediately below the liver is a deadly condition, as it involves the region of Disease. M. Leudet states that phlebitis of the *vena porta* produces irregular shivering, *great prostration, delirium and coma.* Portal congestion, a symptom of various congestive diseases, is a prostrating influence which may alone become fatal, and when overcome by strong emetics the relief is great.

Jaundice alone, being an inactive condition of the liver, produces no disturbance of the brain or lungs, and may coexist with good general health; but active diseases of the liver produce many morbid effects, *according to the location of the disease* in the liver, as pathognomy indicates.

Prof. Stokes speaks of inflammation at the upper surface of the liver as liable to extend to the base of the lungs or resemble pleurisy, and requiring similar treatment — he cared not whether the disease had passed the diaphragm or not; but just below the liver the effects were entirely different. "Here we come (says Prof. Stokes) to an interesting and curious fact. You recollect that in speaking of gastro-enteric inflammation I alluded to the nature of the accompanying fever, and stated that it was commonly of a low character and that there were no local inflammations in which the fever was so often *typhoid* as in affections of the *gastro-intestinal surface.* This, I believe, has been one great cause of the ignorance of medical practitioners with respect to gastric and enteric inflammations; they have been most commonly looked upon as *cases of typhus* and treated accordingly."

Thus there seems to be a morbific or prostrating locality just below the liver (where the portal vein brings in the most degenerate blood of the entire circulation) which constitutes the seat of the lowest vitality or closest approximation to disease. This explains the deadly power of a disease located just below the liver, — *yellow fever,* — in which the liver is not congested, but the stomach is chiefly involved.

Stokes and Graves describe a gastro-intestinal fever in Meath Hospital which proved fatal in the first sixteen cases, some dying in four to six hours. Disease near the portal vein brings deadly prostration. In inflammation of the stomach, according to Watson, there is fever of a low type and a small, weak pulse; the patient is pale and faint, with collapsed features, cold extremities and a damp skin. "In all this we see a tendency to *death by asthenia.*" "The mode of dying in these cases is precisely what Bichat describes as death beginning at the heart." "Intense inflammation of the stomach may destroy life in

twenty-four hours." In this prostration from vital exhaustion the pulse is almost or quite imperceptible, and medical aid extremely unsuccessful.

In gastritis, according to Prof. Stokes, "the patient rapidly falls into a low typhoid state. There is no form of inflammation, except that which accompanies severe peritonitis, in which the typhoid state comes on so rapidly. Inflammations of the digestive tube differ in general from similar affections of other organs chiefly in this, that *prostration* rapidly supersedes excitement. A patient laboring under inflammation of the brain will exhibit for a long time the decided symptoms of high excitement, and of what has been termed the phlogistic diathesis. Acute pneumonia and inflammatory affections of other parts will go on for days, *without prostration*, and require the use of the lancet; but gastritis is a disease in which the inflammatory symptoms, as they are called, last but for a very short time."

ABDOMEN AND LOWER LIMBS.

The tendency of the abdominal system to exhaustion, disease, fever and death, as taught by Sarcognomy, might be illustrated by volumes; and this tendency remains in the organs after death, as a source of infection. Prof. Macartney says (Macartney on Inflammation, p. 62): "The sero-purulent fluid found in the large cavities after death (if no means of prevention be employed) seldom fails to infect persons, and *the most dangerous animal fluid* is that contained in the cavity of the abdomen after puerperal peritonitis, or the serum found in parts which have suffered diffused or gangrenous inflammation."

We now perceive that the pathological phenomena of the brain, the lungs, the heart, the pleura, the liver and the abdomen correspond with what Sarcognomy indicates, and if it were worth the trouble one might build up a system of Sarcognomy from the facts of pathology alone.

Dysentery and typhoid are diseases of great suffering, — especially the former. Sarcognomy shows that the inferior portions of the body have strong tendencies to restlessness, gloom, pain and suffering. Dysentery, which occupies the lower part of the trunk and often extends into the rectum, is a disease of torturing pain as well as depression. This difference in the upper and lower regions is verified in pyæmia. According to Dr. Sedillot "the most common seat of the muscular abscess is in the thickness of the muscles of the *calf*, where, though causing *great pain*, it may produce but little redness or swelling. The vast purulent collections occasionally occurring in the pectoral and deltoid muscles are sometimes only discoverable by attentive exploration, *so little do the patients complain of them.*" How great

the contrast between the mental conditions of thoracic diseases and the prostrating gloom and suffering which begin in the liver and extend to all below, showing the maximum of irritation and pain in the gout and rheumatism of the lower limbs.

There is probably no more severe pathological suffering than that of the rectum and anus which was experienced by the lower class of Irish, in the famine of 1846-7-8, from the impaction of potato skins in the bowels. The pain of the rectum and anus was described as piercing like a knife, forbidding sleep, and sometimes producing cramps of the lower limbs. It was pronounced by women ten times worse than that of the severest labor.

All diseases of the bowels have more or less of the character which Sarcognomy assigns to the abdomen, — relaxation, debility, enfeebled pulse, prostration, despondency and oppression of the brain, fever and a putrescent tendency. Many pages might be filled with illustrations of this, if I were preparing a systematic work. Melæna or hemorrhage of the bowels is described by Prof. Wood as follows, after speaking of the feelings of *oppression, dejection of spirits*, languor, weakness, and pale, sallow or dingy complexion: "A patient in this condition is unexpectedly affected with griping pain, nausea, increased paleness, and more or less *giddiness, faintness, depression of pulse*, and weakness of the extremities, attended by a discharge from the bowels, which on examination proves to be blood of a black color, *very offensive*, and otherwise altered in character. In some instances, again, the hemorrhage comes on without any premonitory symptoms, and the evacuation from the bowels and its attendant *depression* are the first obvious signs of disease. This depression is sometimes extreme, and the patient *may sink beyond the point of reaction. Sudden prostration and death* have occurred without any evacuation."

"Next to diseases of the brain (says Dr. E. H. Dorland) no other class of ailment is capable of producing the amount of physical and mental suffering, systemic functional disturbance and general nervous debility, as are diseases of the rectum." The chief pathological relation of the abdomen is to FEVER, to which each of the viscera contributes its peculiar share, according to the laws of Sarcognomy. I had written a full exposition of fevers as viewed in the light of Sarcognomy, which they illustrate, but do not deem it expedient to introduce the essay in this volume.

The contrast between the upper and lower portions of the human body is very great. The bosom, the seat of love, is highly attractive, and is offered to the beloved object. The nobility of the form lies in the development of the chest. The odors of the bosom and axilla are pleasant. The lower end of the trunk, the region of the buttocks,

is associated only with ideas of aversion and disgust and unpleasant odors. Diseases involving the lower part of the trunk are not only painful and distressing but offensive. The most offensive portion of the cutaneous surface is that between the toes. The climax of offensive disease is reached in the neighborhood of the sacrum, which controls the leg and foot, in certain conditions of the rectum. This was most forcibly illustrated in the Irish famine after 1846, when the rectum in many peasants became obstructed with potato skins, requiring mechanical removal. Dr. Popham, of the Cork North Infirmary, says, after describing the condition and severe sufferings of these patients: "Another sign which we considered almost pathognomonic of this ailment was the *peculiar fetor* emanating from the patient. It is impossible to describe this offensive smell by comparison, as it was altogether *sui generis*, presenting nothing of the natural feculent odor of the evacuations. It appeared to us more like the effluvium from a combination of vegetable and animal matters in an advanced stage of putrescence. Its insupportable nature to the stomach may be judged from the fact that during the measures necessary for the relief of the patients, the nurses of the Infirmary, though habituated to disagreeable smells, could not abide this putrid and disgusting odor, without being seized with retching. Its rapidity of diffusion was also remarkable, the air of the whole hospital becoming quickly saturated with it. When the senses have once taken cognizance of it the unfortunate person can be at once detected amongst a host of applicants for relief."

The lower limbs being associated with the base of the trunk and the basilar region of the brain brings them into close connection with animal life as well as its offensive elements. Hence the danger of amputation and injuries, which is greater in proportion as they approach the seat of Vital Force on the thigh. The report of three hundred amputations at Guy's Hospital, London, for 1859, shows that thirty per cent of the amputations of the lower limbs resulted fatally, and but ten per cent of the upper limbs. In traumatic amputations of the lower limbs sixty per cent were fatal.

Intense stimulation of the lower limbs has great power to rouse the dormant vitality of the base of the brain.

The relation of the lower limbs to the brain is not realized by physicians generally as it should be to enable them to relieve the head and chest. It was well enforced by Prof. Stokes, in his lecture on Encephalitis, as follows: "You will meet with cases of cerebral inflammation in the last stage, with profound coma, general paralysis, an imperceptible pulse and tracheal rattle. It is a melancholy thing to be called to a case of this description, where the ordinary means

furnished by medicine are so inadequate to the removal or even the alleviation of symptoms, and yet it is a fact that even under these circumstances cases have been cured by the adoption of an extraordinary measure. This consists in the employment of enormous and sudden counter-irritation, by pouring boiling water over the lower extremities, while at the same time ice is applied to the head. This is certainly an extraordinary and barbarous method, but it has succeeded in rescuing the patient as it were from the jaws of death. One of the most singular cases of this kind is recorded by Lallemand — that of a man upwards of sixty, who in consequence of a fall on the head was attacked with encephalitis, which was *mistaken for an essential fever* until the tenth day. At this time he was first seen by Lallemand, who found him laboring under severe and long-continued syncope; the right extremities flexed; the hand firmly closed; the surface on this side insensible; the eyelids closed; the eyes turned up, squinting and insensible to light; complete loss of hearing and intelligence. The body was covered with a cold viscid sweat; the respiration frequent and stertorous, and the pulse absent. Lallemand proposed pouring boiling water on the ankles, and at the same time applying ice to the head, which was consented to with great reluctance by the other medical attendants. At the moment the boiling water was applied there was a sudden motion of the whole body; the left arm was agitated, the eyes opened, and the pulse could be felt at the wrist. In half an hour the boiling water was applied to the thighs with still greater effect, — color returned to the face and the pulse became fuller. From this time improvement went on. Deep, suppurating wounds were produced by the boiling water, which took more than six weeks to cicatrize. The patient's recovery was perfect. In Dr. Mackintosh's work you will find this practice recommended."

Dr. H. E. Greene of Kentucky reports a severe and protracted case of epilepsy in a negro, defying all medical treatment, which was suspended after he fell in a fit and burned badly the whole of the bottom of the left foot. During four months his fits ceased and his health was good, but the fits returned after the foot was healed.

SYMPATHIES OF THE PELVIC REGION.

The inferior pelvic region of the body, corresponding to the under-jaw region of the head (covering the interior basis of the middle lobe) is the antagonist of that portion of the brain at the temporal arch, just behind a vertical line from the ear, which sustains the tone of the brain and entire nervous system, and has therefore been called Sanity. The inferior pelvic region, the antagonist of Sanity, tends to general

unsoundness or insanity, as it prostrates the entire nervous system when it becomes the *controlling* element, — by which I mean suppressing its opposite. It must be borne in mind that no function of any organ is evil in its normal action in association with its opposite. Evil exists only when the balance is destroyed.

As this location is in the body, its effects are chiefly physiological derangement and exhaustion, but by inevitable sympathy they impair and derange the brain and nervous system. Unsoundness of mind, erroneous judgment and unwise impulses are very common conditions, but it is not until reason is completely overpowered that the term insanity is used.

Every physician knows how completely the constitution of the male is destroyed by sexual excesses,* and how completely uterine derangements prostrate the nervous system of woman. In other words, any considerable irritation located in the lower pelvic region, and thus concentrating the vital action in that direction, drawing it away from the tonic regions of the constitution, is fatal to nervous integrity. The general experience of the medical profession would sanction this statement, but the most remarkable illustrations of its truth have been recently furnished by Prof. E. H. Pratt of the Chicago Homœopathic Medical College, in his work on orificial surgery. That he should exaggerate the truth is not surprising and does not diminish the value of his instructive experience. Prof. Pratt boldly asserts that: "In all pathological conditions, surgical or medical, which linger persistently in spite of all efforts at removal, from the delicate derangements of the brain substance that induce *insanity*, and the various forms of *neurasthenia*, to the great variety of morbid changes repeatedly found in the coarser structures of the body, there will invariably be found more or less irritation of the rectum, or the orifices of the sexual system, or both. In other words, I believe that all forms of chronic diseases have one common predisposing cause, and that cause is a nerve waste occasioned by orificial irritation at the lower openings of the body. These irritations induce a rigidity of the sphincters guarding the parts, which either continues, sympathetically affecting the rest of the involuntary muscular system, and steadily draining the nervous power that supplies it, until the whole struggle terminates in a rigor mortis, or, tiring out in the hopeless grip, relaxes into the inertia of paralysis."

As these statements (though too sweeping as to the origins of dis-

* Lallemand (on spermatorrhœa) expresses it forcibly by saying, "I regard spermatorrhœa as the true cause of all the cases of hypochondriasis, ischuria and debility which are attributed to affections of the urinary organs. This position is proved, I think, by the weakness and rare occurrence of erection, the rapidity of ejaculation and the increased fluidity of the semen observed in most of these patients."

eases) appear to be sustained by his cases, the question naturally arises. Why do irritations in this locality have these tremendous deranging effects on vitality, *so different from the effects of irritations elsewhere?* Dr. Pratt's explanation is the best he could derive from the common physiology, but Sarcognomy replies that the vital forces or functions have special locations for all these tendencies and capacities, and there is a definite law for their location, which embraces a system of antagonism or opposite tendencies. According to these laws animal force and intensity or violence of action increase as we descend in the brain and body — the base of the brain and the base of the trunk having the maximum of violent force, which is exhausting and injurious when predominant, while the summit of each have their maximum of gentleness and stability of vital action, which is happy in its tendency.

Sensibility, increasing as we descend, attains its maximum in the head at the base of the middle lobe, where Ferrier demonstrated its location in the monkey, about thirty years after I had discovered it in man. Passional violence and force also increase along with sensibility, but occupying a more posterior location, as in the human constitution power is behind and sensibility before. The maximum sensibility that gives pleasure is found in the sexual apparatus, and the intensity of this overrules all other human motives, so that it stimulates animals to battle and often stimulates men to murder even the innocent object of their passion, as well as competing rivals.

Of course painful disturbances in this region are more overwhelming than such disturbances anywhere else, and I recollect that Dupuytren, the famous French surgeon, expressed the opinion that laudanum was three times more effective in the rectum than in the stomach.

There are two locations relating to sensibility in the brain, and two corresponding locations in the body. The most familiar location is at the base of the middle (or temporo-sphenoidal) lobe, just above the level of the zygoma (cheekbone), a location which I discovered in 1837-38, and which has of late been illustrated by Ferrier's experiment on the monkey, abolishing sensibility by injuring the base of the brain. There is another correlative location, the external avenue to which is just below the prominence of the chin and the internal location at the medulla oblongata. This is correlative with the temporal organ, but differs materially. The temporal organ has an intellectual character, and gives us knowledge of objects touched or felt; the posterior organ is not intellectual, but produces a peculiar excitability and intensity of feeling, which acts upon the emotions and passions instead of the intellect. The corresponding locations on the body are, for the temporal organ the epigastric region, nearer to the sternum than the umbilicus, where any one can verify the sensibility by proving with a sudden

pressure that it is the seat of the greatest sensibility in the body, as the opposite region, the shoulder, is the seat of the greatest hardihood. The lower organ has its representative, in Sarcognomy, below the umbilicus at a space corresponding to the womb. Hence uterine excitements (especially in hysteria) develop a remarkable exaltation and perversion of sensibility, both physical and moral — giving rise to a great variety of diseases or quasi diseases, which are not organic, and which disappear in a marvellous manner by mild or even mental agencies properly applied. *Hyperæsthesia* is especially the characteristic of hysteria, of which the etiology and pathology were elaborately developed in the classical work of Prof. Schutzenberger. He shows that disease of the ovaries is a very prominent but not universal cause, and that pressure on the ovaries may induce pain and convulsive action. Hyperæsthesia is the special indication of hysteria. According to M. Bricquet this hysterical hyperæsthesia is located in the muscles, and felt immediately beneath the skin, where very slight pressure or scratching will produce very great pain. This symptom was present in all but twenty of four hundred hysterical women. It has often been maltreated from not understanding its nature as due to hysteria. Schutzenberger speaks of this as a pathological condition, the material element of which is unknown ; but there is no such material element as he seeks,—exaltation of the uterine nerves is entirely sufficient, or the corresponding nervous cause may be in the medulla oblongata. In this state very slight electro-magnetic currents become intolerable, and they are all cases in which the gentle manual treatment prescribed by therapeutic Sarcognomy is promptly efficient. Hyperæsthesia about the head is found in about nine-tenths of these cases ; and also hyperæsthesia of the muscles of the back is frequently found, but five times more frequently in the lower than the upper part of the back, and much more often on the left side than the right. This must not be confounded with disease of the spine.

A very remarkable fact is the close sympathy between the two locations of Sensibility on the body, producing *epigastralgia* as a common symptom of hysteria, — being observed, according to M. Bricquet, in 317 out of 358 hysterical subjects. The two organs in the brain, according to the fixed laws of cerebral science, are correlative, co-operative and similar. Being thus co-operative in action on the brain, we should expect a similar co-operation and sympathy in the body, which is verified by the epigastric pains just stated in five-sixths of the cases of hysteria reported by M. Bricquet. This epigastralgia is produced, according to M. Bricquet, not only by fully developed hysteria and menstrual derangements, but by depressing moral emotions, as in girls subjected to unkind treatment. The pain is continuous and severe, and

may be aggravated by emotion, but is not affected by digestion, and he condemns the mistake of treating this as an affection of the stomach or solar plexus. It tends more to the left than the right side. The study of the brain explains this emotional relation, as the organ of Sensibility is closely connected with that of emotional excitement.

This hyperæsthesia and epigastralgia have been sadly misunderstood heretofore, and thus allowed to continue through life, wearing out the patient, making active occupation intolerable, and bringing on emaciation and premature old age. M. Bricquet affirms the ease with which it is relieved, and every magnetic healer finds it under his control.

The pleuritic extension of this pain has been mentioned, and M. Bricquet speaks of it as extending, after epigastralgia, in a semi-circle from the fifth to the eighth ribs, chiefly on the left side. The hyperæsthesia of hysteria produces intense pain and sensibility to pressure, but is free from inflammation, and differs materially from rheumatism and neuralgia and is much more easily relieved. Its dependence on the sexual system, which is the seat of the greatest sensibility, is further illustrated by the remark of Dr. Garratt (the electrician) that "there is not a question that habitual indulgence in mere thoughts of venery may also produce it, and much more the habitual excess." Thus we perceive the two correlative organs in the brain are thoroughly illustrated by their correspondences in the body; and a complete investigation would show that all organs which co-operate or antagonize in the brain have, in their somatic organs, as shown by Sarcognomy, a similar co-operation or antagonism.

Sarcognomy indicates that the lower pelvic region is the seat of physiological insanity or derangement, corresponding to cerebral insanity, capable of deranging every bodily function, and of this Prof. Pratt has given many new illustrations of great value. He states that dilation or stretching of the sphincter ani, including its internal portion, will produce a greater effect upon a patient in anæsthesia than any other operation, as it causes an oppression and almost entire paralysis of breathing, if done with force. "A similar effect (he adds) is often seen in the use of sounds in the sexual organs, but it is not so marked or so constant." It may be added that the same degree of force is not used.

He gives the sympathy of involuntary fibres, contracting and relaxing, as his explanation "why orificial work has such instantaneous and truly marvellous effects upon the entire circulation, warming at once all parts that before were abnormally cold, and cooling parts that were abnormally hot, starting, as if by magic, functions that had been long dormant, and subduing those that had been abnormally

active; in a word, more or less completely *re-establishing uniformity* of circulation and function."

These results attained by a successful surgeon fully establish as a practical therapeutic doctrine the principle of Sarcognomy that the lower pelvic region is the source of nervous derangement for the body and that by removing its irritations we may restore the normal and more vigorous action of the nervous system. I feel much indebted to Dr. Pratt for giving this demonstration of what I have long known to be true, but he is mistaken in limiting explanation by the term orifices. "Orifices" exist and occupy a great part of the space, but it is not really necessary that the irritations should be *in the orifices*, to produce deleterious effects. The injurious effects arise and obtain their maximum at the inferior pelvic region, and analogous effects are developed as we approach that region, whether in the sacrum, the bladder, the womb, or the lower small intestines, in which we have the cause of the very deranging effects seen in typhoid. The extreme mobility and irregularity of the nervous system under the influence of the womb approximates closely to the phenomena of insanity,* and even counterfeits a great variety of diseases which are explained when we find that they belong to the protean condition of hysteria.

That the lower pelvic pain produced in the rectum should almost suspend respiration is explained by the close connection of the pelvic region with the higher emotions, which give expansion to the chest. Love ever agitates the respiration and expands the lungs when intense, and sexual love belongs to the region from the sacro-lumbar junction to the external genitals, in the exercise of which respiration is greatly affected.

* The connection of *uterine disease and mania* was illustrated by Dr. Lever in *Guy's Hospital Reports* (Oct., 1849), by a case in which a woman who had borne six children was subject to melancholy, insomnia and religious delusions, fearing eternal damnation, with an increase of the symptoms at catamenial periods. Treatment in an asylum, not directed to the uterine condition, had not relieved her. The uterus was enlarged somewhat, ante-verted, deeply congested, with granulations and strong pulsation in its bloodvessels, and discharging a thick mucus. Cupping the sacrum and local treatment of the uterus, including leeching, restored her to health and sanity. Dr. L. reports a similar case, and states his conclusion that insanity sometimes depends on disease of the sexual organs and may become permanent unless *they* are treated, and that at the close of the treatment counter-irritation over the sacrum will be a valuable auxiliary.

"Simple feverishness in nervous subjects or in those whose brain is kept in a constant state of activity will often occasion delirium. Violent pain may also cause it. Some organs seem also to have the privilege of being in their diseases accompanied by this symptom. *The womb is one of those.* In some instances of painful and difficult menstruation, the patients are delirious at each period. Others become *partially insane* at the beginning of pregnancy, and puerperal mania has been met with frequently by all those who have given much attention to the practice of midwifery." — Andral: *Lectures on General Pathology.*

In cases of ABORTION artificially procured, Majendie says that he has ascertained that serious mental disorders or incurable mental alienation often follow — in other cases, horrible sufferings, abdominal neuralgia, etc., arise, which are as bad as death itself.

The most remarkable feature of Dr. Pratt's operations is their simplicity and success. Mechanical dilation of the anal region, removal of rectal pockets and hemorrhoidal tumors, and the introduction of sounds into the genital organs have been his main reliance, though he has also used electric, pneumatic and homœopathic medical treatment quite judiciously, as I infer from his language, but to what extent he has relied upon them is not apparent from his brief monograph.

To give the full force of Dr. Pratt's testimony, his entire book should be quoted. I will venture, however, to quote the very brief statement of the character of each case and the mode of treatment.

Twenty cases are reported by the author, embracing "Nervous prostration," "Insanity and insomnia with constipation," "Secondary syphilis" (two cases), "Nervous prostration, followed by cough, hectic fever and night sweats," "Constipation, — congestion of the liver, following operation," "Articular inflammation," "Albuminuria," "Hyperæmia of the liver," "General debility with complications," "Rheumatism, dropsy and heart failure," "Jaundice," "Chronic bronchitis, nervous prostration, slight paralysis agitans and rheumatism," "Melancholia," "Hydrocephalus," "Chronic diarrhœa," "Priapism," "Supra and infra-clavicular abscesses," "Abscess with infiltration of pus," and "Abscess of the groin."

The operations in these cases were stretching the sphincter, removal of rectal pockets, removal of rectal papilla, passage of urethral sounds, dilation of the uterine canal, excision of piles, dilation of the uterus by sounds, cauterizing of rectal ulcer, circumcision, and removal of remains of hymen. The brief reports of the cases are very interesting and are corroborated by thirty-two similar reports from other physicians. I would mention his case of melancholia: "A stout, heavy man, aged forty-seven, afraid of everybody and everything; has not left his room for months, and yet presenting no organic lesion; bowels regular." A contracted sphincter and four rectal pockets were discovered and treated, and a contracted prepuce slit and sound passed. Result: perfectly cured in three weeks, though "he had been under the care of doctors, more or less, for ten years."

The most marvellous examples are the two cases of syphilis, cured *without medicine*, by removal of rectal pockets and papilla and passing sounds. These cases show the wonderful recuperative power of the nervous system when relieved from the lower pelvic irritation which prostrates its power, and the importance of looking for hypo-pelvic irritations when the recuperative power of nature is inefficient. They give additional force to the teaching of Sarcognomy that in all cases of insanity and paralysis the hypo-pelvic region should be investigated

and should be subjected to tonic treatment for the sympathetic effects on the brain. This will produce a new era in the treatment of insanity. Positive currents from the perineum to dorsal spine summit and to the axilla will become a leading element of treatment in addition to surgical and medical measures.

Of the cases reported as treated and cured by orificial surgery in this volume, there were twelve cases of chronic headache combined with various other symptoms, two of neuralgia, one of blindness, one of paralysis, one of hydrocephalus, one of priapism, one of melancholia and two of insanity, — twenty-one neurological affections in the fifty-two cases.

It is to be observed that the sympathy between the body and the brain varies greatly in different constitutions. In those impressible individuals upon whom I have made the most satisfactory experiments, the sympathy is very close and the brain responds promptly to every experiment on the body. But in those whose sensibility and impressibility are moderate the brain is much less affected by bodily conditions and the body itself is less affected by external influences and by mental conditions. The sensitive nervous system brings soul, brain and body into closer communion with each other, as well as closer communion with the influences of nature, art and society, so that they are more amenable to treatment, whether it be medical, nervauric or psychic. When the nervous sensibility is below par, mental influence is of less importance and treatment requires to be more strictly local.

I have referred to these cases because they make so striking and practical a demonstration of what is taught by Sarcognomy and confirmed by all relevant pathological history — the increasing intensity of functions as we descend in the trunk, and the antagonism of these intense functions to the orderly action of the brain, although they may, under control, act in harmony with it to intensify or strengthen its action. The sexual power, which is so destructive in its riotous excess, is one of the most important elements in lending its intensity to invigorate both love in its passionate strength and courage in its passional energy.

An illustration of this intense sensibility in morbid conditions is shown in sensitive urethral caruncles, which are described in the *Columbia Hospital Report* of 1873, as follows:

"If we except fissure of the anus, there is no disease of so trifling a magnitude, productive of so much intense suffering as irritable caruncle. I have known women who would bear the pains of childbirth without a murmur shrink from the necessity of urinating, and put it off until the bladder became over-distended, and when finally

compelled to pass water, their groans revealed the excruciating agonies they endured. Prof. Simpson reports the case of a shepherd's wife who had one of these sensitive caruncles at the orifice of the urethra, and whenever she was obliged to pass water was in the habit of going some distance from her cottage, in order that she might moan and scream unheard, so intense and intolerable was the suffering."

The influence of these pelvic irritations (which are not confined to orifices but occupy a large space), in deranging the entire nervous system, has innumerable illustrations, and is familiar to physicians. Prof. Stokes, referring to this, says: "If the encephalitis be caused by the suppression of bleeding piles or a sudden checking of the menstrual flux, leeches to the anus or vulva are found useful."

A good illustration of the exhaustive influence which may be developed in the iliac and inguinal regions is shown in a case reported by Dr. Geo. Johnson of malignant disease affecting a retained testicle in the abdominal cavity. The disease produced considerable pain, and the patient (a tutor at College) began to *lose flesh and strength.* A tumor appeared above Poupart's ligament on the right side, which then rapidly extended to the median line, producing *great emaciation and exhaustion*, and death in about a month from its appearance.

This exhaustion and emaciation are equally conspicuous in dysentery and typhoid. In this case the mental symptoms were not reported.

Dr. Wm. Cumming, F. R. C. P. E., described, in the *Medical Gazette* of December, 1849, a disease located in the lower bowels and accompanied by the discharge of a peculiar membranous, fibrinous matter from the bowels, which are alternately constipated and relaxed — in some uniformly costive. There is frequently a discharge of blood in evacuation, and a sense of exhaustion afterwards. The evacuation is generally painful. They have a fixed pain in the left iliac region (or sometimes the hypochondriac, or both), of a gnawing, irritating character, sometimes acute and severe. The pain in the course of the colon is increased an hour or two after the taking of food, and is temporarily relieved by the counter-irritation of a mustard plaster.

The patients look *emaciated and anxious*, with a peculiar and *characteristic expression.* "In all there is more or less nervousness, greatly increased towards night, inducing sleeplessness, and when towards morning sleep does come on, nightmare is frequent — dreams (generally of an unpleasant nature), invariable. One lady was troubled with *spectral illusions.*" Prof. Simpson found the command of language in such cases very much impaired, but Dr. C. says in many cases this symptom is absent.

"When the affection has been of long duration the *mental irritability* is very great, and, what is more painful still, the patient's views and feelings are *perverted and distorted.*" The disease often originates in drastic purgation, and is more common in females than in males — often accompanied by dysmenorrhœa.

Dr. C. found all the cases easily cured by omitting aperients and using electro-galvanism between the spine and iliac region, aided by tar internally — the galvanism regularly overcoming constipation and dispersing the morbid conditions. These cases show clearly the tendency of the iliac region to depression, exhaustion, and mental impairment and derangement.

The effect of hypogastric diseases on the brain and the connection of this region with the liver (to which the venous blood from the intestines is carried) are illustrated in Dr. Prout's work on the "Stomach and Urinary Disorders," p. 75, as follows: "Excessive acidity of the cecum is generally accompanied by a deficient secretion of bile, and sometimes by a complete temporary suppression of the bilious discharge, apparently from spasmodic constriction of the common gall duct, or it may be of the biliary ducts themselves. In this state of things all individuals feel more or less of uneasiness ; but the point we wish to mention is that certain individuals, under these circumstances, experience what is called a *nervous headache.* This species of headache is frequently accompanied by nausea, is confined to the forehead, and, when severe, produces complete intolerance of light and sounds, and a state of mind bordering on delirium. After a greater or less period, the pain ceases, sometimes quite suddenly ; and the remarkable circumstances to be mentioned here are: that this sudden termination is preceded by a peculiar sensation (sometimes accompanied by an audible clicking noise) in the region of the gall duct ; that immediately afterwards a gurgling sensation is felt in the upper bowels, as if a fluid was passing through them ; and that, in a few seconds, when this fluid, which we suppose to be bile, has reached the cecum, the headache at once vanishes like a dream. One of the greatest martyrs to this species of headache I have ever seen invariably experiences the train of symptoms above described, and I have witnessed it in a greater or less degree in many instances ; indeed I have experienced it in my own person."

What are the psychic and physiological effects of rectal irritation by impacted materials was shown in Ireland, and reported by Dr. Popham of the Cork Infirmary in the *Lancet* of June 19, 1850. The patients were suffering from impaction in the rectum of potato skins and matter of diseased potatoes, producing great internal tenderness and an erysipelatous ring of two or three inches around the anus.

There was a peculiar offensiveness of fetor emanating from the patient, compelling those around him to nausea or vomiting, but seldom any nausea or vomiting in the patient — the appetite not being affected — the site of the irritation being remote from the small intestines and stomach. In some feeble subjects there was prostration and chilliness of the surface; in those of more sanguine temperament, the surface was hot and perspiring. The pulse under irritation seldom rose above 100, and fell back when the irritation was relieved. The pain was sometimes worse than that of parturition.

A notable moral symptom in this disease is the *recklessness* of the patients and their *disregard of decency*. As to the mental condition of such patients, it fully illustrated the low animal condition associated with the region of the sacrum. Dr. Popham said: "They are unable to rest in any position, but throw themselves about without seeming much to regard either personal injury or the natural restraint imposed by the presence of others." Some of the persons are *very intractable*, requiring to be held down by force, while under treatment; and, maddened by pain, they seem not indisposed to follow the example of Horace's patient, "cum fit pugil, et medicum urget."

All irritations at the base of the trunk disturb the brain. Dr. Roeser reported in a German journal, in 1859, a case in which the coccyx of a woman was separated from the sacrum and forced to the left. Pain extended up to the neck and arm, and she could not move. Her countenance was distorted, and there was "*confused headache and some mental disturbance.*" When it was restored by pressure she 'felt as if *roused from a dream* and all her pains vanished." *

Even at the head of the thigh we have this disturbing influence. In Malgaigne, on fractures, it is stated that "extra capsular fracture, like the other variety, may involve much more serious dangers; too often, whether from the shock occasioned by the external violence, or from some unfortunate predisposition of the patient, there ensues *nervous delirium*, or *intense fever* of the adynamic type, which sooner or later terminates fatally." In cases progressing unfavorably after the first dangers are over, "the pain about the seat of the injury persists; œdematous swelling of the affected limb, and sometimes even of the sound one, occurs; a *slow fever* undermines the strength, impairs the appetite and disturbs the sleep; and in hospitals there appear occasionally, also, symptoms of scurvy." The tendency of severe injuries at the summit of the thigh must necessarily be adynamic. Wounds and surgical operations in that region are very fatal.

* "Hoffman mentions a boy, who, after a blow *on the sacrum*, was seized with a violent convulsive affection, nearly resembling tetanus, with loss of memory, difficult articulation and delirium. The complaint continued with great severity for five days, and afterwards returned at nearly regular periods for six months." — *Abercrombie, p. 201.*

In the region of the womb we find an exalted sensibility, tending to mental irregularity, sometimes approaching insanity, and tending strongly to imaginative deception. Dr. Watson says the deceptive appearances displayed in the bodily functions and feelings find their counterpart in the mental. Dr. Prout says the whole energies of the patient's mind are bent on deception.

Hysteria, which has been called the Protean disease from its vast variety of symptoms, appears to be an exalted sensibility and excitability associated by some recondite law with the imagination so as to produce a fantastic play of conditions which give a dramatic imitation of insanity, convulsions of various kinds, and almost every form of disease, — the dramatic imitation being often so perfect as to deceive spectators and even puzzle physicians.

It is often difficult indeed to tell to what extent the diseases of women are the products of organic trouble, or of the nervous conditions which belong to the hysteric temperament and appear or disappear with but slight, if any, organic cause. We may have a variety of convulsions resembling epilepsy and tetanus, we may have apparent diseases of the joints and contractions of limbs, apparent palsies of every variety, coughing, vomiting, hæmatemesis, hæmoptysis, inflamed breasts, hiccoughs, spinal diseases, pains of every variety, and even quasi inflammations.

What does it all mean? Simply exalted sensibility, and impressibility, liable to experience extreme effects from slight causes, and to be controlled by mental conditions, but *lacking in self-control.*

How is this produced? The sensibilities, increasing as we descend in the body, attain an extremely high development in the sexual system, of which the womb is the chief element in woman. This uterine sensibility, belonging to a portion of the medulla oblongata is by the law of Pathognomy associated with the portion of the brain just above the cheekbone, which is the region of sensibility, and impressibility, and which might be called an involuntary region, as it has the minimum degree of will-power, or rather antagonizes the will, and subjects the individual to any transient influence. This sensitive region is closely associated in action with the region of Imagination, Versatility and Pliability, which gives the Protean capacity of realizing any mental condition; just as, in the occiput, Firmness is associated with Combativeness in resisting every external influence. No woman with much Firmness and Combativeness will be controlled by hysteria.

The womb is a part of the pelvic or hypogastric apparatus which deranges the nervous system. But unlike the other hypogastric organs, which belong to the destructive, feverish, wasting and exhaust-

ing apparatus, and leave their effects visible in exhaustive emaciation, gloom, suffering, fever, insanity and death, the womb belongs to the ascending group of developing functions, and consequently the victims of hysteria are neither feverish, insane, gloomy nor emaciated, but present generally a plump and pleasing appearance which contradicts their dramatic display of diseases.

The bladder and rectum, which belong to the class of downward acting expulsives, dealing only with the offensive and injurious, have terrific effects when they are the seat of irritations; and the male genitals, differently constituted, have much more pernicious liabilities than the female, as Pathognomy indicates.

In inflammation of the bladder we have general fever (though the bladder is not so closely associated with calorification as the ileum), accompanied by prostration, anxiety and restlessness. The pain, extending to the perineal and rectal regions and even into the abdomen, is often accompanied by nausea. The bowels are irritated and deranged. It ultimates in great cerebral depression, with a dull, stupid, typhus condition, with a pale, cadaverous countenance, delirium and coma, and sometimes convulsions.

The bladder is next to the region of complete mental derangement, and coincides with lethargy, which we locate at the pubes. Hence its dull, drowsy influence.

In chronic cystitis there is "fever, anxiety, restlessness and gene ral distress," "the strength gives way, rapid emaciation takes place, and the patient dies, in a hectic state, worn out."

Spasm of the bladder produces a feeble pulse, pale surface, sometimes cold perspiration, with "great restlessness and general distress."

Of all physiological functions the sexual are those which have the greatest power over the mind. In their normal action, under the control of the higher faculties, they sustain love, hope, and imaginative brightness of the intellect, which they develop as puberty comes on; but in their abnormal or disordered condition their action is reversed, and in their excess they are debasing and destructive, like all unbridled and controlling action of the lower half of the body. In this they are like the other functions of the lower half of the spinal cord — the muscular functions which use the lower limbs. In their normal action, subordinate to the higher powers, they give force to the character, energy to courage, and ability to endure severe exertion. In their excessive action they tend to brutalize the character and exhaust the entire nervous system, producing prostration and death, with defibrinized blood, by over-exertion.

Dr. Bell observes, very justly, that "there cannot be derangement of function in any part of the animal economy, without some change in

the disposition, mood or mind of the individual. But in no case is this fact so strongly exemplified as in either congenital or acquired defects of the genital organs." "Love and all its associations would be for an eunuch what song and orchestral accompaniments are to a deaf-mute — things unfelt and unappreciated except by analogies" — a statement which shows the unnatural folly and mischief of those systems of religious fanaticism which war against the Divine wisdom of the human constitution, by endeavoring to ignore or suppress an indispensable portion.

"Can there be, for example (says Dr. Bell), a greater contrast in the disposition, feelings and general frame of mind between a young girl suffering under chlorosis and uterine atony and the same person a year afterwards, with rich blood coursing through her heart and limbs and new vitality in her uterine organs?" Even the suspicion of impotence, he says, sometimes causes persons to keep aloof from society with feelings of aversion or suspicion degenerating into misanthropy.

The portion of the body between the sacrum and coccyx behind and the os pubis in front is the portion which corresponds to the region of mental derangement in the brain, productive of fierce insanity mania, idiocy, dementia, paralysis and lethargy, and adjacent to hysteria and melancholy. On the body melancholy appears in front of the hips, and hysteric excitability between the pubes and navel. From this location it appears that the excessive excitability which in the brain makes the liability to insanity and idiocy occurs in the body where the sexual organs, rectum, prostate gland and nerves proceeding to the lower extremities are located. From the latter we may derive the animation and wild energy of passion, which belong to insanity, while from the sexual functions we derive the animation and excitement of normal life, as well as the utter prostration, wretchedness, imbecility and paralysis which they produce in their unrestrained, excessive activity. The insane tendencies of the rectal and anal regions are shown in the reports of orificial surgery and the conditions of the Irish patients described by Popham.

The reader will observe, however, that the body is not the organ of the soul, but the organ of physiological functions; consequently, the rage, the animalism, the delusion, melancholy and imbecility of which we speak, in the body, are not its own functions under irritation, but its effects upon the brain, and unless the brain is affected they are simply corporeal results of an analogous character — derangements of the higher functions of the nervous system in the body, as shown in many diseases and so well illustrated in the reports of orificial surgery.

In the brain the most posterior part of the deranging region produces wildness of excitement and turbulent rage, with terrible energy

— the most anterior produces Lethargy. So, in the body, the most posterior portion corresponds with the nerves supplying the genitals* and the lower extremities, which produce wild, restless muscularity, without intelligence; and the most anterior portion corresponds with the pubic surface, over the bladder, which produces the dull, lethargic or comatose condition attributable to urea (the most narcotic element in the body), and the sexual action which rapidly destroys cerebral and nervous power.

The reader may well imagine my surprise in discovering the external localities of such functions in the body as Sarcognomy reveals (though my surprise was diminished by their previous recognition in the brain), and this surprise was not removed until I could perceive an anatomical and physiological basis for the discovery in the facts that all parts of which Sarcognomy reveals the tendency have an interior structure and operation precisely adapted to realize the psycho-physiological tendencies revealed by Sarcognomy.

Of the insanifying effects of the sexual organs we see ample illustrations, which would require a large volume to portray them, in the fierceness and warfare among animals in their amative season (the rutting season of deer), in the jealousies and combats among men, in the murders prompted by disappointment in courtship or jealousy in marriage, in the total prostration, demoralized and wrecked lives of profligate libertines, the hopeless mental prostration and ruin produced by masturbation and by the abandoned licentiousness of both sexes. The first French book I ever read — Tissot on Onanism — was a frightful record of the ruin produced by this vice, the terrible consequences of which are too well known to need repetition here; suffice it to say that physiology and pathology clearly show that the base of the trunk, when it has undue influence on life, works the destruction of the whole nervous system of the body, as the corresponding region of the brain works the destruction of the mental and moral faculties by its unbridled excess, although in its symmetrical normal action, as an assistant to the higher powers, it is as necessary and valuable as the powers of locomotion and calorification.

In the female sexual system the influence of the womb is less abnormal in its excitement, and I have already spoken of its deranging influence in hysteria as less destructive than the irritations behind and below it. But the womb in its abnormal and downward conditions becomes the bane of woman's life in dysmenorrhœa, menorrhagia and misplacement. Its position is, according to Pathognomic law, a barometer of woman's condition, and when it goes down her whole

* Sir Astley Cooper says that in cases of irritable testes the pain produced by touch is felt in the *back and groin*.

life goes down with it, as her whole life is elevated in the latter stages of gestation, to be prostrated again by its downward expulsive action and the consequences thereof; a critical and tragical time, which may result in prostrating and dangerous disease — in puerperal fever, which, being associated with a region of maximum *sensibility*, has the maximum degree of contagiousness. The typhus fever, which plays upon the brain, produces such contagious energy that a single approach to the bedside has sometimes resulted in an overpowering contagion and speedy and fatal attack. Puerperal fever is still more contagious, because it belongs to the region of maximum sensibility, and physicians, with every possible precaution of disinfection, sometimes carry the disease from one patient to another. I have even a stronger record in the case of a physician, Dr. Huntley of Jarrow-on-Tyne, described in the *British Medical Journal*, February, 1875, who had a remarkable experience of persistent contagion that was truly marvellous. Puerperal fever broke out in his practice and seemed to be confined to his patients. Changing his clothes, bathing, etc., failed to prevent the contagion, and he went to Ireland, staying there six weeks to dissipate the contamination; but in the first two or three cases on resuming practice the infection reappeared, and he gave up this branch of his practice to a substitute in whose practice no puerperal fever appeared. He thought, therefore, that the toxic influence might be associated with his person. This could not be established, however, unless he had entirely laid aside his former clothing. At any rate it illustrates the intense sensitiveness and susceptibility of the uterine region, which is also illustrated in the familiar fact that hysteria is contagious, and when one case appears in a female hospital it rapidly spreads, whether by mental or physical sympathy. It is illustrated, too, in the extreme impressibility of the gestating female, which affects the condition of her offspring, and in the contagious diffusion of superstitious fanaticism, with its wild, hysterical actions, due to the hysterical element in both sexes.

The puerperal fever has more serious consequences than hysteric excitement, as it is liable to run into *puerperal mania*. It frequently runs into a wild, incoherent and furious character, but very seldom into dementia.

The deranging influences of the external genitals of the male, in their disorders, are better understood of late. Abnormal states of the glans and prepuce in children are sometimes connected with aphasia as their cause, which is explicable only by the fact that the larynx corresponds with the location of the organ of Amativeness in the brain, and is associated in its development with sexual puberty.

Dr. A. A. Camp, basing his views chiefly on the experience of Dr.

L. A. Sayre of New York, says : "In many children, partial paralysis, lack of power of co-ordination and apparent idiocy, are dependent, in a great part at least, upon some irritation of the genital organs. In males this is sometimes due to a constriction around the glans penis, producing continual priapism, the result of which is wasting and exhaustion of the nervous system, sufficient to produce more or less paralysis, and in some instances a complete loss of speech and vision. In girls, on the other hand, much the same results are produced by an irritation of the clitoris, which is not uncommon. All kinds of treatment for such cases are utterly useless, unless we recognize and remove the cause of the irritation. . . . Of course this condition presents itself to us in all degrees of severity, from one of simple irritation to that of complete constriction of the prepuce, and so its symptoms will also vary."

"Prominent among the most marked cases are the following symptoms : Sometimes the patients are to all intents and purposes idiotic. They are neither able to speak nor walk, nor to feed themselves; sometimes they are blind. On account of falling, and reflex convulsions of the extremities, the disease, by an inaccurate observer, might be called epilepsy. The patient usually sits cross-legged, and in some there presents such a rigidity of the tendons that it is almost impossible to produce flexion of the legs. Certain phases of this deformity have been mistaken by even astute observers, who have been on the point of operating for a club-foot."

Dr. Sayre was once called by the famous Dr. Sims to operate upon a boy of five years (who was unable to walk from his knees being placed at an angle of 45 degrees) and "perform tenotomy upon his hamstring tendon." Dr. Sayre discovered that it was not a contraction of the flexors, but paralysis of the extensors, and therefore, instead of cutting, had him subjected to the galvanic current, in doing which he found the penis tender, erect, and imprisoned in the contracted prepuce. Touching the orifice of the urethra produced a convulsive movement and orgasm. Circumcision was performed, the glans uncovered and the parts soon restored to their natural condition, and the child fully restored in three weeks without any other treatment than this operation. A psychometric observer would not have made the mistake of Dr. Sims.

Dr. Sayre mentions a case of hip disease in a boy, which apparently had no other cause than the state of the prepuce and irritation of the glans penis.

Dr. Camp relates the case of a boy of about four years, in whom there appeared to be congenital paralysis of the lower limbs, as he had never used them, and also paralysis of the sphincters, resulting in involuntary

discharge of urine and fæces. He found the penis in semi-erection, and notwithstanding a previous circumcision, which did some good, there was adhesion at the corona glandis, which he dissected away and healed the wound. He quickly recovered the control of the sphincters, and was very slowly regaining the use of his lower limbs.

I need not dwell upon the horrors of syphilis, to illustrate any further the pernicious energy of sexual disorders in the destruction of the integrity of the nervous system — a mischief which is the more widely and terribly diffused on account of the great sensitiveness and consequent contagiousness attached to the sexual system; a law which is efficient in establishing sympathy, unity and harmony in the conjugal relation, and also efficient in diffusing evil, in demoralization, disease and misery.

SYMPATHIES OF THE LIMBS.

The upper and lower limbs are parallel and analogous in their relations — those of the upper limbs being on a higher or more psychic plane.

The arms sympathize with the trunk according to their parallelism, — the humerus with the chest, the forearm with the abdomen, the wrist and hand with the pelvic region. Hence we affect digestion and assimilation by the internal surface of the forearm, and calorification and sensibility by the wrist and hand. It has long been known that we may produce coolness by plunging hands and wrists in cold water, and that their warmth has a diffusive influence. Dr. Reeves of West Virginia has utilized this principle by applying cold water to the wrists in typhoid fever, which readily reduced the temperature. He passed the cold water through rubber tubing wrapped around the wrists.

The control of all inflammatory diseases, especially of the head and chest, by diversion to the region below the knees, has been fully illustrated in the chapter on Pneumatic treatment; but the psychic relations of the thigh and leg require a fuller illustration.

Passing below the region of the evil passions, sensuality and insanity, at the base of the trunk, we reach the region of muscularity and turbulent impulse on the thighs, which is controlled by the lower portion of the spine, the seat of the evil passions, which find their executive instruments in the lower limbs. Turbulence is the most comprehensive term for the thighs, and this becomes more violent as we descend the thigh, reaching its maximum of violence at the knees, from which we may expect the most violent and uncontrollable displays of temper. Below the knees the same blind animalism exists, with less and less of intelligence as we descend to the foot, in which intelligence disappears.

The passionate character of the thighs is well illustrated in the history of gout and rheumatism. "The gouty patient (says Watson) is apt to be excessively dejected and hypochondriacal, morbidly attentive to every bodily feeling, disposed to exaggerate his sufferings, and apprehensive of the worst event." "In the head, occur pain, giddiness, transient affections of the vision and of the hearing, threatenings of palsy and apoplexy."

"How few are the men (says Dr. Ashburner) who acquire gouty habits, who do not lose the power of calm reasoning. They are notoriously an irritable race. Their irritability often leads them to conclude that every one is wrong except themselves. No matter if you can bring abundant evidence to prove the insanity of their conduct, it is of no avail."

While irritative diseases develop this passionate violence, injuries of a different character, free from inflammation, produce a different effect, as I realized last year by a severe fall on the knees, which produced a great impairment for some weeks of all the energies of mind and body. Dr. J. A. Roberts reported in the *Eclectic Medical Journal* of October, 1887, a case of swelling in the thyroid and parotid glands, accompanied by a painful swollen knee, which produced a sullen, crabbed state of mind, so that "he could scarcely speak, unless asked a question," and the doctor "had hard work to gain his confidence." But after opening the gland, discharging its pus, and aspirating four ounces of fluid from the knee, he "became quite talkative," and "anything I wished was cheerfully granted."

The great changes of deportment and sentiments in patients are explained by the nature and location of their diseases to those who understand Sarcognomy.

Pain is itself an irritating element, but in other parts of the body it may be accompanied by fortitude or resignation; but in the foot, which is the site of the first attack of gout, the irritation is accompanied by the violence of the lower limbs and the unreasoning or anti-cerebral character of the foot. This local disturbance deranges the balance even of strong constitutions; but if we would realize fully the character which Sarcognomy recognizes in each spot, we must have a constitution sufficiently weak, sensitive and impressible to surrender to the control of the local excitement. In such a case the mind may be entirely perverted by an irritation in the foot, as in a case reported by Dr. Anderson of idiocy and violence produced by an injury of the foot and the tibial nerve, the irritation of which extended up the thigh.

Dr. James Anderson of New York reported in the *N. Y. Medical and Physical Journal* of December, 1822, a case of prostration of the intellect from an injury of the foot affecting the anterior tibial nerve. The

patient, G. T., a lad of fourteen years, of plethoric habit and nervous temperament, "received an injury on the top of the foot from a stone thrown with violence by one of his playmates." The injury was attended to, but appeared unimportant until eight or ten weeks later, when pain and swelling occurred and were treated by Dr. Kissam with fomentations, saturnine applications, and, as the pain increased and irritation extended, frequent blisters, "saline cathartics and other purgatives," and "large anodynes" were used without success. The pain extended up the trunk of the nerve, affecting the adjacent muscles with spasms, "the pulse increased in frequency and force," "though the digestive organs performed their duty with wonted regularity if not increased strength."

The pain now extended above the knee and was very severe; belladonna, cicuta, assafœtida, gave no relief. The great toe was drawn at right angles by the extensor pollicis, and any attempt to return it produced great suffering.

"At about three months from the time of the accident the whole system became involved in these spasmodic irritations, and his nervous energy enfeebled. The common sensorium was disturbed: he lost his reasoning and recollection, was unable to distinguish occasional visitors, or *recognize even his parents or any members of the family;* his *mind became imbecile and idiotic;* he was deprived of *the ability to read or distinguish the letters of the alphabet.* As the pain extended up and beyond the thigh it spasmodically affected the muscles of respiration, and at the invasion of each paroxysm of suffering his breathing became more frequent and labored. This frequency of respiration was generally the first indication of approaching exacerbation. Though his distress was most acute, he *gave no utterance to his feelings.* While the paroxysms were on him he would roll his fist and *imitate the actions of a pugilist,* but with much greater violence and rapidity, often striking his nearest and best friends and all around him. If no person was in reach of his arms, the force of his actions would be lost in the air." The violent actions and excited respiration belong, according to Sarcognomy, to the lower part of the thigh.

It was determined finally to divide the tibial nerve. An incision was made on the outside of the tibia, about four inches above the ankle, and about an inch of the nerve cut out. The toe then resumed its place, the local affections soon ceased, the wound healed, and his health of body and mind was restored.

Something slightly analogous to this was related by Brown-Sequard in his lectures, on the authority of C. DeMorgan, as follows:

"A lad aged fourteen as he was getting up in the morning was heard by his father to be making a great noise in his bedroom. On

the latter rushing into the room, he found his son in his shirt, violently agitated, talking incoherently, and breaking to pieces the furniture. His father caught hold of him and put him back into bed, when at once the boy became composed, but did not seem at all conscious of what he had done. On getting out of bed he had *felt something odd*, he said, but he was quite well. A surgeon who was sent for found him still reading quietly, with a clean tongue and cheerful countenance, and wishful to get up. He had never had epilepsy, but had enjoyed good health hitherto. He was told to get up; but on putting his foot on the floor and standing up his countenance instantly changed, the jaw became instantly convulsed, and he was about to rush forward, when he was seized and pushed back onto the bed. At once he became calm again, said he had *felt odd*, but was surprised when asked what was the matter with him. He had been fishing on the previous day, and having got his line entangled had waded into the river to disengage it, but was not aware that he had hurt his feet in any way, or that he had even scratched them. 'But in holding up the right great toe with my finger and thumb, to examine the sole of the foot, the leg was drawn up, and the muscles of the jaw were suddenly convulsed, and on letting go the toe these effects instantly ceased.'

"There was no redness, nor swelling, but on the bulb of the toe a small elevation, as if a bit of gravel, less than the head of a pin, had been pressed beneath the cuticle. On compressing this against the nail cautiously, a slight convulsion ensued; there was no pricking when pressed, but he said *something made him feel very odd.* The slightly raised part was clipped away, no gravel was found, but the strange sensation was gone and never returned."

Here I must pause in this hasty pathological illustration of Sarcognomy, although the theme is not half exhausted. Time does not permit a fuller exposition at present, and the readers of this volume care less for these illustrations, which are not really needed, than for the full development and practical application of the science. To those who do not know the absolute certainty of Sarcognomy as a science, and have made no experiments for its illustration, it is probable that the facts of pathology may be useful in relieving them from the feeling of uncertainty which embarrasses the approach to a new and revolutionary doctrine in science.

It is true that a full development of the facts of pathology would of itself organize a system of Sarcognomy in the mind of a clear thinker, and there may be those whose minds are so engrossed in pathological studies, and so averse to the experimental methods that

illustrate Sarcognomy, as to prefer that kind of evidence, of which there is a great abundance already in medical literature, and a still larger amount will appear when the human constitution and its diseases shall have been studied in the light of Sarcognomy.

CONCLUSION.

In presenting this brief abridgment of what I had intended saying of the pathological illustration of Sarcognomy, I trust the reader will accept it, not as *the demonstration* of the doctrine, but merely as a hint or indication of the wealth of illustrative facts which may be adduced, which would fill several volumes, and which, if I should no have time to collect and present them, will, I trust, be presented by some of the indefatigable devotees of science. Every day of the year there are facts enough developed among millions of patients to make a demonstration entirely complete and satisfactory of all the doctrines of Sarcognomy. When the science becomes known, these facts will no longer be neglected.

The ease with which experiments upon the brain and the body may be made by any intelligent person according to my methods, the consciousness of the action of the different portions of the brain which any sensitive person may attain in studying the sensations of his own head, and the innumerable illustrations of Sarcognomy observable in disease will make the subject so clear to intelligent inquirers, that the wonder will be, hereafter, how anything so plain and so accessible could have been so long overlooked and its first scientific announcement received with such absent-minded indifference, owing to the mental perversions of a false education and the self-satisfied enjoyment of old theories, with a thoughtless unconsciousness of the vast realms of knowledge upon which mankind are slowly entering. This work, I hope, may be the means of stimulating the sincere and fearless lovers of beneficent science to explore still farther the boundless realm to which it has opened the way, which will be enjoyed by thousands when the hand that pens these lines shall have vanished from earthly scenes.

GLOSSARY

Of Unfamiliar Words, which Readers Unfamiliar with Scientific Language are Advised to Peruse Before Reading this Volume.

Abiogenesis—production of life without prior life (now considered impossible).
Ablation—taking away, as in cutting out parts of the brain.
Acephalous—without a brain.
Achromatic—without color (applied to glasses which refract light without producing colors).
Actinism—the active chemical power of light.
Acupuncture—treatment by puncture with a needle.
Adjuvant—assisting.
Albumen—the substance of the white of an egg and the serum of blood (found also in vegetable substances).
Albuminoid—similar to albumen.
Alimentation—supplying with food.
Alvine—relating to the intestines.
Amaurosis—blindness from paralysis of the optic nerve.
Amœba—a minute microscopic living body which moves and changes its form.
Amœboid—similar to amœbæ.
Amenorrhœa—deficiency of the menses.
Amorphous—without shape.
Ampere—a certain amount of electric force equal to one volt of power passing through one ohm of resistance.
Anastomose—to unite with another tube, as when two arteries connect.
Anelectrotonous—the condition of a nerve produced by entrance of a positive current.
Angular gyrus—see gyrus angularis.
Anæsthesia—suppression of sensibility.
Anæsthetic—capable of producing anæsthesia.
Anæmia—deficiency and poverty of the blood.
Aneurism—a morbid enlargement of an artery.
Anode—the entrance of a current of electricity.
Anodyne—pain relieving.
Antiphlogistic—antagonistic to inflammation.
Antiseptic—opposed to putrefaction.
Antithesis—opposition or contrast.
Aorta—the largest artery of the body, proceeding from the heart.
Aphonia—loss of voice.
Aphasia—loss of language or speech.
A priori—reasoning before knowing the facts is called the a priori method.
Assimilation—appropriating to the living body
Asphyxia—stopping of breath, as from drowning, hanging, etc.
Athlete—one well trained and strong.
Atonic—lacking tone or strength.
Atrophy—loss of flesh.
Atropine—the active element of belladonna.
Auricle—one of the cavities of the heart that receives the blood.
Ascultation—listening (with a stethoscope, commonly, to explore disease).
Axilla—the cavity under the shoulder.

Bacilli—microscopic substances in the blood supposed to produce disease. They are regarded as vegetable infusoria.
Bacteria—minute bodies found in decomposing or morbid fluids, generally about the ten-thousandth of an inch long.
Basilar—belonging to the base.
Bichromate of potash—a combination of chromic acid with potash.
Bifurcation—forking.
Bifurcated—forked or divided.
Bioplasm—the living matter from which the tissues of the body are formed.
Bougies—slender instruments which are introduced into the urethra.

Cadaveric—appertaining to a corpse.
Caisson—a frame or box used under water in bridge building; also a box for ammunition in war.
Caloric—the element or force which produces heat.
Capillary—the adjective applied to a minute hair-like tube.
Capsule—a small cap, cover or seed vessel.
Carbohydrates—compounds of carbon and hydrogen.
Carbon—a simple substance, nearly pure in charcoal, entirely pure in the diamond.

CARDIAC—relating to the heart.
CARIES—decay of bones.
CAROTID—the name of an artery in the neck, carrying blood to the head.
CARNIFICATION—making flesh.
CATALEPSY—a sudden suspension of sensibility and voluntary motion.
CATELECTROTONOUS—the nervous condition produced at the negative pole.
CATHODE—the vicinity of the negative pole.
CAUDATE—with a tail.
CELLULAR—composed of cells.
CEPHALIC—relating to the brain.
CEREBELLUM—the little brain beneath the cerebrum and behind the ears.
CEREBRUM—the chief mass of the brain, with surface composed of convolutions.
CERVICAL—relating to the neck.
CHORDA TYMPANI—the name of a nerve of the seventh pair going to the tympanum.
CHOREA—an agitating or convulsive disease commonly called St. Vitus' dance.
CHYLOPOIETIC—relating to the formation of chyle in the digestive organs.
CILIA—very minute hair-like bodies that have a vibratory motion.
CILIO-SPINAL—relating to a dorsal portion of the spinal cord, which affects the iris.
COAGULATE—to curdle or solidify albuminous liquids.
COHERENCE—adhering together; consistency.
COLLOCATION—placing together.
COMA—unconsciousness and oppression of the brain.
COMMISSURE—a structure that unites other parts (a term used in the anatomy of the brain).
COMMUTATOR—that which changes or reverses.
COMPLEMENT—that which completes.
CONCOMITANT—that which goes with it.
CONVOLUTED—composed of convolutions.
CORNEA—the anterior part of the eyeball.
CORONAL—pertaining to the upper surface.
CORPUSCLE—a minute particle.
CORRIGENT—correcting.
CORPORA STRIATA—the striped bodies; white and gray substances just behind the front lobe, which send fibres to the spinal system.
CORPUS CALLOSUM—the firm body of white fibre connecting the right and left hemispheres of the cerebrum.
CREPITANT—crackling or snapping.
CRURAL—relating to the thighs.
CUNEUS—a portion of the occipital lobe of the brain at the median line, corresponding to the upper part of the occipital bone.

DECUSSATE—to cross, as do the anterior fibres of the medulla oblongata.
DEFECATION—discharging the contents of the bowels.
DELTOID—the name of the shoulder muscle that lifts the arm.
DIAGNOSIS—discovery of condition in disease.
DIAPHRAGM—the thin muscle at the base of the lungs which pulls them down for inspiration.
DIAPHORESIS—perspiration.
DIVAGATION—going astray.
DORSAL—relating to the back. The dorsal vertebræ of the spine extend from the neck to the loins.
DYNAMOMETER—an instrument to measure strength.
DYSMENORRHŒA—diseased, painful, disorderly menstruation.

ELECTRODE—that through which electricity passes.
ELECTROLYSIS—decomposition by electricity.
ELECTROLYTIC—pertaining to electrolysis.
ELECTRO-MAGNETISM—magnetism produced by electricity.
EMBROCATION—a liquid remedy applied to the surface.
EMBRYO—the first rudiments of an animal or plant.
EMPIRICAL—guided by experience (sometimes applied contemptuously to those not guided by scientific doctrines).
ENSIFORM CARTILAGE—the lower end of the sternum or breastbone.
EPIGASTRIUM—the surface over the stomach.
EPITHELIUM—the cuticle covering a mucous membrane.
EXPIRATORY—relating to expiration.
EXTENSOR—that which extends (applied to muscles that extend the limbs).

FAHRENHEIT—the name of the inventor of the thermometer in common use among the English nations.
FARADIC—developed by Faraday (applied to the electric action produced by induction).
FEMUR—the thigh bone.
FŒTUS—the unborn infant.
FIBRIL—a delicate fibre.
FIBROUS—composed of fibres.
FIBRILLARY—of a fibrous nature.
FLEXORS—the term applied to muscles that bend the limbs.

GALLIC ACID—an astringent acid found abundantly in the gall nut.
GALVANOSCOPE—an instrument to show galvanic action.
GALVANIZED—treated with a galvanic current.
GANGLION—an enlargement in the course of a nerve; also a tumor on a tendon.

GANGRENE—mortification or death of the tissues.
GELATINOUS—similar to gelatine.
GLOBULE—a very small round body.
GRANULES—little grains.
GYRUS ANGULARIS—a convolution of each occipital lobe midway from right to left and from upper to lower margin.

HEBETUDE—dulness; stupidity.
HELIX—coils of wire used in a battery.
HEMIPLEGIA—paralysis of one side of the body.
HÆMOSPASIA—control of the blood by atmospheric pressure.
HÆMOSTASIS—control of the blood by ligatures.
HEMORRHAGE—loss of blood.
HEMORHOIDS—piles (tumors near the anus).
HÆMOPTYSIS—spitting blood (hemorrhage from the lungs).
HEPATIC—relating to the liver.
HEPATIZATION—acquiring a solid texture like the liver.
HOMOGENEOUS—of a uniform constitution.
HUMERUS—the arm bone from shoulder to elbow.
HYDRANGEA—as a medicine a tonic for the kidneys.
HYDRASTIS—or golden seal; a powerful tonic, especially for mucous membranes.
HYDROCEPHALUS—water on the brain.
HYDROGEN—a simple element; the lightest of gases, a constituent of water.
HYDROTHERAPIA—water cure (treating diseases with water).
HYGIENE—the science of health.
HYOSCYAMUS—henbane (an anodyne nervine).
HYPERÆSTHESIA—excessive sensibility.
HYPERTROPHY—overgrowth.
HYPNOTISM—properly, producing sleep; but improperly applied to producing a passive state and controlling the mind by suggestion.
HYPOCHONDRIA—the space at the base of the ribs; the mental condition which that portion produces.
HYPOGASTRIC—a term applied to the lower part of the abdomen.
HYPOPHOSPHITE—a substance partly composed of hypophosphorous acid, united to a base.
HYPOSTATIC—caused by stagnation or a lower position.
HYPOTHESIS—a supposition or theory.

ILEUM—the lower intestine between jejunum and colon.
ILIUM—the hip bone.
INDUCTION—the effect of an electric current in producing another current in adjacent bodies.
INERTIA—the tendency to remain in a fixed condition either of rest or motion.
INFLUX—inflowing.
INFUSORIA—microscopic animalculæ found in infusions.
INSPIRATORY—relating to inspiration or taking breath.
INSULATED—separated from other things (applied in electricity to bodies surrounded by non-conductors).
INTEGUMENT—the skin or covering.

JUGULAR—the name applied to the large veins in the neck, carrying blood from the head.

LANCINATING—tearing; lacerating.
LEYDEN JAR—a glass used to hold static electricity, having one charge on the inside which keeps a similar charge on the outside.
LOCOMOTOR ATAXY—a dangerous disease of the spinal cord interfering with the control of the muscles.
LUMBAGO—a rheumatic affection of the muscles of the loins.
LUMBO-SACRAL—applied to the junction of the lumbar vertebræ with the sacrum.
LUXATION—dislocation of a bone.

MAMMÆ—the female breasts.
MARASMUS—wasting away.
MECHANO-THERAPY—curing by mechanical means.
MEDIAN—the middle; between.
MEDULLA—the marrow; medulla oblongata (the oblong head of the spinal marrow in the base of the skull).
MEMBRANE—a skin-like tissue composed of fibres found in the interior of the body, either mucous, serous or fibrous.
MENINGEAL—relating to the meninges or membranes of the brain.
MENINGITIS—inflammation of the membranes around the brain.
MIASMATIC—of the nature of miasm or malaria.
MICRO-ORGANISMS—very small living bodies.
MILLIAMPERE—the thousandth part of an ampere or electrical current. Ten milliamperes are an efficient galvanic current.
MOLECULES—the smallest particles into which bodies may be divided.
MUCOUS—of the nature of mucus, a viscid, glairy fluid on the surface of internal membranes.

NASCENT—being developed.
NATES—the buttocks.
NEOPHYTE—a new convert.
NERVAURA—the emanation of the nervous system.
NEURASTHENIA—exhaustion of the nervous system.
NEURINE—the matter of which the nervous system is composed.

NEUROLOGICAL—relating to neurology, the science of the nervous system.
NUCLEUS—a centre with some degree of density, around which matter gathers or organizes.
NYMPHOMANIA—uncontrollable sexual impulse in a woman.

OCCIPUT—the back part of the head.
OCCIPITAL—relating to the occiput.
ŒSOPHAGUS—the tube in the throat through which we swallow.
OLEAGINOUS—of an oily nature.
OPTIMISTIC—disposed to recognize only the hopeful aspect of a subject.
OSSEOUS—bony.
OSMOSIS—the passage of a fluid through a membrane or porous partition.
OVUM—an egg (or the vesicle from which animal life originates).
OVA—plural of ovum.
OXYGEN—the gas in the atmosphere that sustains life.
OXIDIZABLE—capable of being oxidized or rusted.

PAPILLÆ—minute projections containing nerves.
PARIETAL—from parietes (the side walls); the name applied to the skull bones of the middle superior and upper lateral part of the head.
PARENCHYMA—the substance of animal organs, distinct from the bloodvessels.
PATHOGNOMY—the science of the expression of feeling or impulse (a mathematical science).
PATHOLOGICAL—relating to disease.
PELVIS—the cavity between the hips, sacrum and pubis.
PERIPHERY—the part remote from the centre.
PERISCOPE—a comprehensive general view.
PERISTALTIC—a term applied to the contractile movement of the intestines.
PERITONITIS—inflammation of the peritoneum.
PIA MATER—a fine membrane on the surface of the brain.
PINEAL GLAND—a small nervous structure lying on the tubercula quadrigemina, at the origin of the optic nerve.
PLASTIC—capable of being moulded into form.
PLEURISY—inflammation of the pleura which invests the lungs.
PLUMULE—the expanding germ of a plant.
PNEUMOGASTRIC—the name of a nerve going from the medulla oblongata to the lungs and stomach.
PNEUMONIA—inflammation of the lungs.
PNEUMATOLOGY—the science of the soul.
POLYPI—the plural of polypus (a tumor named from the animal polypus).
PONDERABLE—capable of being weighed or having weight.
POPLITEAL—relating to the popliteal muscle, a flexor muscle from the upper end of the thigh to the tibial bone.
POTENTIAL—possessing power.
PRECORDIAL—before the heart.
PRIORITY—being before.
PROTEIN—a general term applied to such a compound of carbon, oxygen, hydrogen and nitrogen as is found in animal substances generally.
PROTOPLASM—organized matter capable of life (a conception similar to protein).
PSORA—a cutaneous disease or itch.
PUBERTY—sexual development.

RADICLE—a small root.
RAMOLLISSEMENT—a French word for softening (usually applied to the brain).
RATIONALE—a reasonable explanation.
RECURRENT—running back.
REGIMEN—regulation or mode of living.
REOPHORE—a current bearer in electricity.
RHEOSTAT—a current obstructor.
RHONCHUS—a rattling, wheezing sound in breathing.
RIGOR MORTIS—the stiffness of death.

SACRUM—the bone forming the end of the spinal column.
SANATIVE—promoting health.
SATYRIASIS—excessive sexual impulse in a man.
SCIOLISM—superficial, incorrect knowledge.
SENSORIUM—the part that recognizes sensations (usually applied to the brain.)
SEROUS—of the nature of serum (also applied to membranes which are not mucous.)
SEROSITY—a serous fluid.
SIESTA—a short sleep in the afternoon.
SOLAR PLEXUS—a mass of ganglionic nerves below the diaphragm, near the spine.
SOMNAMBULISM—literally, sleep-walking; a dreamy condition in which the subject has much intelligence and intuition.
SOMNILOQUENCE—speaking in the somnambulic condition.
SOPORIFIC—capable of producing sleep.
SORBEFACIENT—promoting absorption.
SPERMATOZOA—the animalcular moving bodies in semen.
STERNUM—the breastbone.
STRIATA—literally striped. The corpora striata are the nervous substance just behind the front lobe from which muscular impulses proceed.
SYNTHESIS—putting things together.

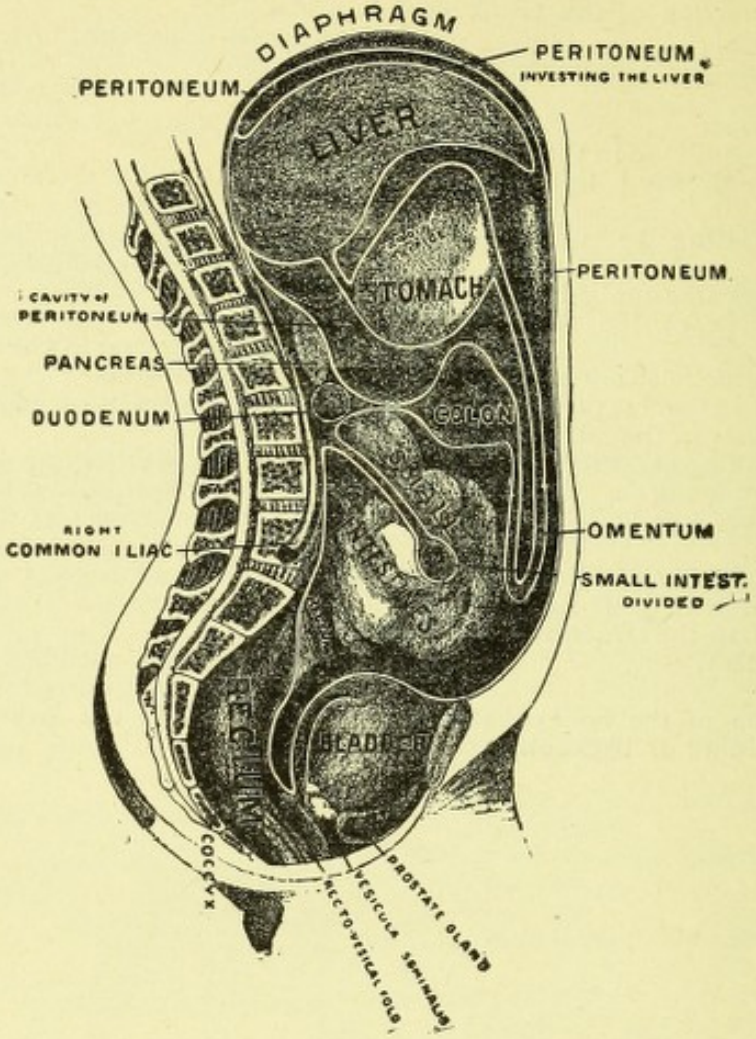
TERRA INCOGNITA—a Latin expression for an unknown land.
THALAMI—the first large expansion of the ascending fibres of the brain, above the medulla oblongata and pons.
THERAPEUTIC—healing.

THORACIC—relating to the thorax.
THORAX—the portion of the trunk containing the ribs.
TIBIA—the principal bone from the knee to the foot.
TOXIC—poisonous.
TRACHEA—the windpipe in the neck.
TRANSLUCENT—allowing light to pass through.
TRAUMATIC—relating to or caused by wounds.
TRIFACIAL—the name applied to the three-branched nerve of the face, or fifth pair.
TUBERCLE—a small deposit of devitalized substance occurring in various parts of the body, chiefly in the lungs.
TURGID—swelled or bloated.
TYMPANITIC—showing a flatulent distension of the abdomen.

ULNA—the chief bone of the forearm.
UNSTRIATED—not striped (a descriptive term applied to the structure of the voluntary muscles).

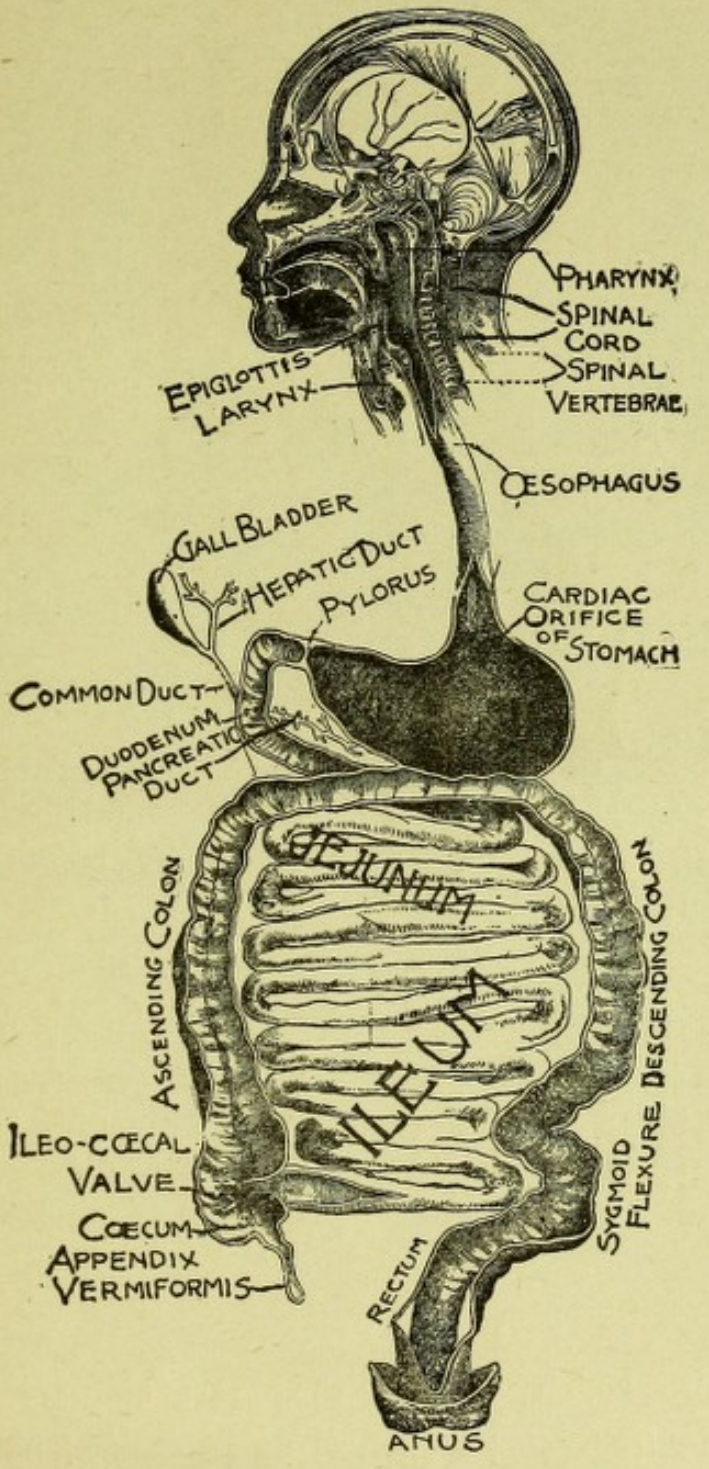
VERTEBRA—one of the bones that make the spinal column or backbone.
VITREOUS BODY—the clear fluid in the back of the eye.
VASCULAR—composed of vessels.
VASOMOTOR—moving or controlling the vessels (a term applied to the minute ganglionic nerves which govern the arteries).
VENTRICLE—one of the muscular portions of the heart which propels the blood.
VIBRIONES—the infusoria developed in putrefying animal fluids, not materially different from bacteria.
VESICLE—literally a minute cell or bladder.
VISCERAL—relating to viscera, the soft organs in the trunk.
VOLITION—the art of willing or determining.
VIVISECTION—cutting up living animals.
VORTICES—plural of vortex, place of a whirling movement of fluids similar to an eddy or whirlwind.
VISCERA—organs in the trunk, abdominal and pulmonary.

ZONA PELLUCIDA—pellucid zone (the transparent ring surrounding the yolk in the centre of the ova of mammalian animals).

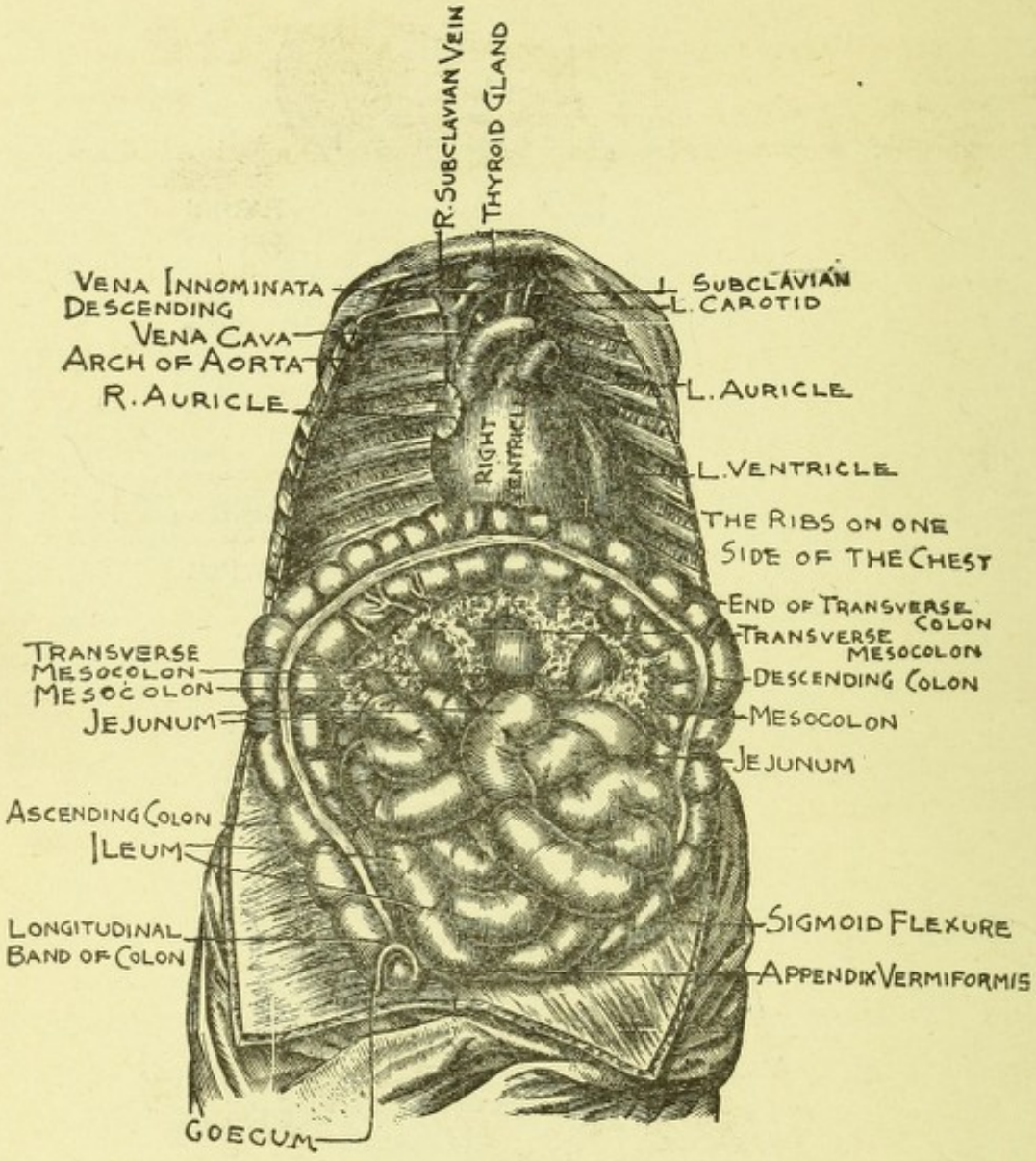


This engraving in addition to the other views of the viscera will help the physician to apprehend more readily the effects of manual and electric treatment. We see in this view, that independent of the distribution of the spinal nerves and the sources of the ganglionic nerves, the relations of proximity should be considered. Thus the rectum is adjacent to the sacrum, and the bladder is nearly on the same level, the womb lying between. The five lumbar vertebræ, counting up from the section of the common iliac artery, are seen to be opposite the mass of intestines — the two upper lumbar vertebræ, which are adjacent to the kidneys, are opposite to the pancreas and to the lower margin of the stomach, while the transverse colon corresponds to the second and third lumbar vertebræ. The stomach corresponds to the last two dorsal vertebræ and first lumbar, and the liver, as its development varies, may occupy any portion of the level of the six lower dorsal vertebræ.

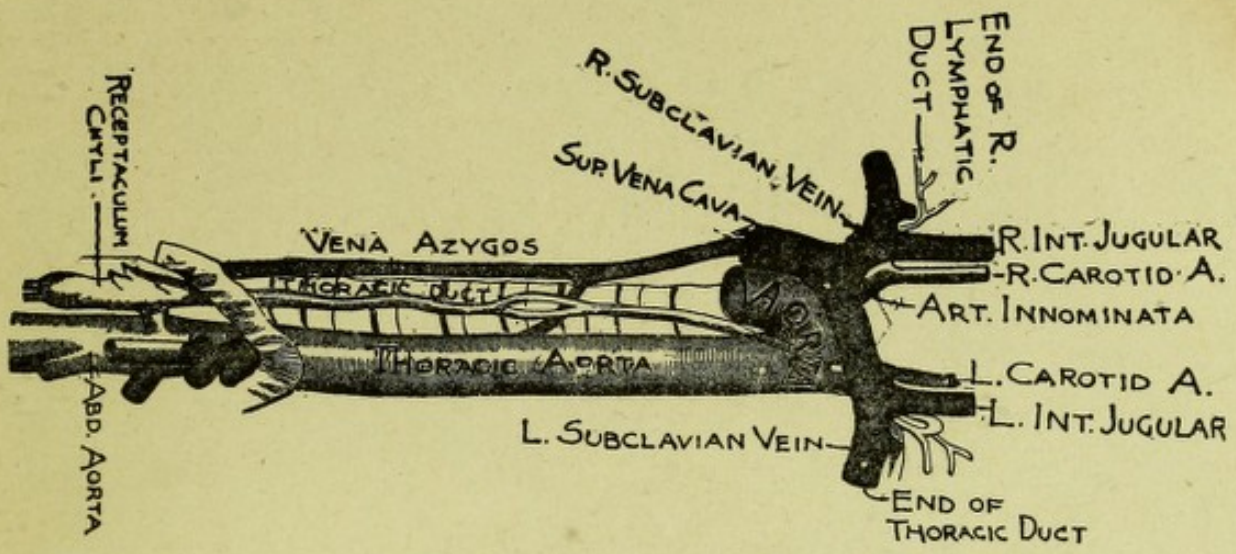
These positions should be borne in mind when we pass electric currents through the organs, or when we would reach them by the influence of the hands or of cupping apparatus.



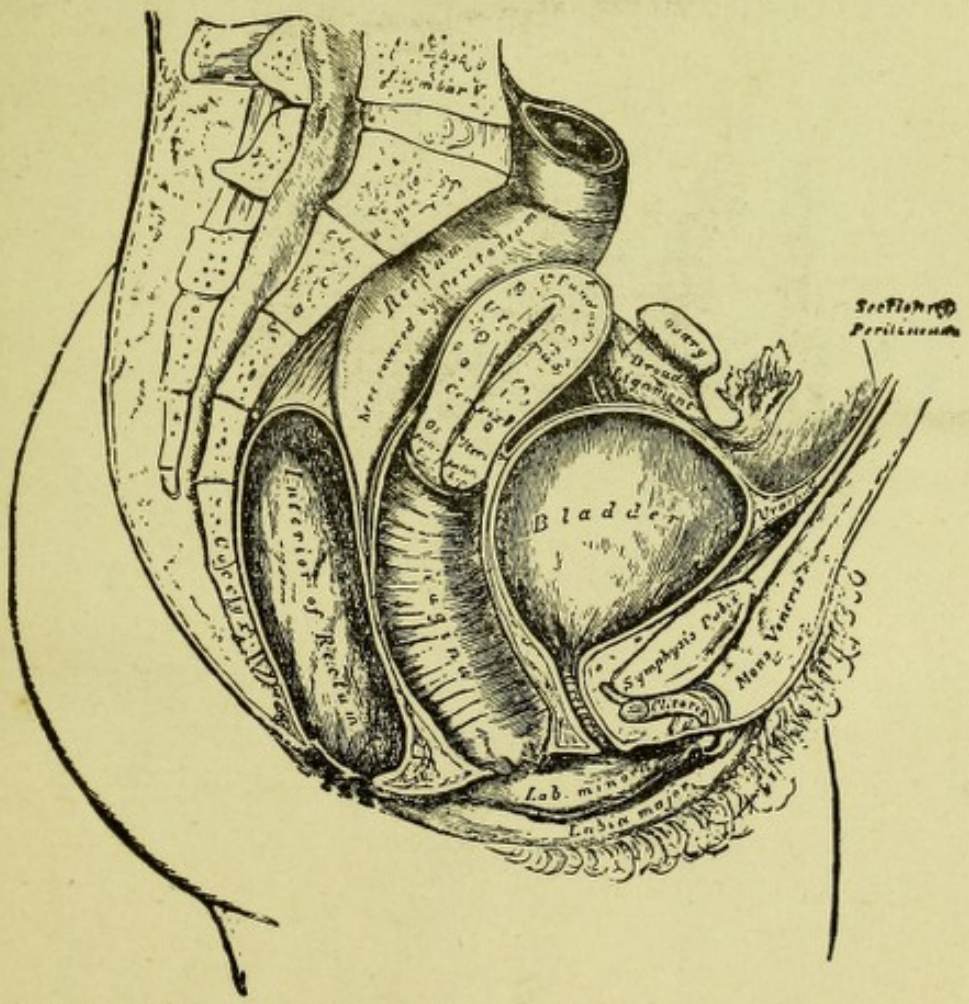
THE DIGESTIVE ORGANS, or Alimentary Canal, are here drawn out to show all the constituent parts, which are duly labelled. This will prepare the reader to understand the next engraving, which shows the parts nearly in their natural position.



In this view, which includes the heart and its large blood-vessels, the uplifted colon conceals the stomach, liver and spleen. The names explain all the parts except the mesocolon, which is a band formed by the peritoneum (investing all the abdominal organs) to which the colon is attached.



THORACIC DUCT AND AORTA. — In this view the vessels are presented horizontally as they appear when lying down. The reader will turn up the engraving to understand their normal position. We see the aorta turning its arch between the fourth vertebra and second rib to descend — in the chest called the thoracic aorta, and below the diaphragm the abdominal aorta. The nourishing chyle, gathered by the lacteals from the intestines, together with the lymph gathered by the lymphatic absorbents from the entire left side and entire lower half of the body, goes into the *receptaculum chyli* (receptacle of chyle) opposite the second lumbar vertebra, and, being now similar in most respects to the blood, the duct ascends eighteen or twenty inches and enters the left subclavian vein (coming from the arms) near the first rib. It flows into the vein in the horizontal position much more freely than when we are standing up; hence that position favors nourishment and growth. The horizontal position is the best for rest and digestion. The right and left subclavian veins, fed by the right and left jugulars from the head, are seen going to the superior vena cava (which carries their blood to the right heart) to enter its auricle. This great vein also receives a supply from the vena azygos, a singular vein coming up and bringing blood from below the diaphragm to mingle with the blood from above in the vena cava, just before it reaches the heart. On the right side we see the right subclavian vein receiving the right lymphatic duct, which brings in the lymph absorbed from the right side of the upper part of the body.



LOWER END OF TRUNK OF FEMALE DIVIDED ON MEDIAN LINE.

In this view, the names of each part being inscribed, little comment is necessary. The bladder is shown fully distended, pressing back the parts behind it, which would come forward when it is emptied. The junction of the sacrum and last lumbar vertebra is shown.

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