

**Principles of Osteopathy**  
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## PRINCIPLES OF OSTEOPATHY.

BY

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The underlying principle, as applied to osteopathy, is expressed in the word "ADJUSTMENT."

What is Osteopathy? If the principle of Osteopathy is, as we have said, the principle of adjustment, applied as a universal law, then we will define Osteopathy something like this: Osteopathy is a system, or science, of healing that uses the natural resources of the body in the corrective field:

- (a) For the adjustment of structural conditions;
  - (b) To stimulate the proper preparation and distribution of the fluids and forces of the body; and
  - (c) To promote cooperation and harmony inside the body as a mechanism.
- (1) According to this the body is a mechanism. That is, it is an order of machine, all of the parts of the machine working together for the common good of the mechanism.

(2) In addition to the body being a mechanism, the body is its own commissariat. In other words, it takes the raw materials from the field of nature and it uses those materials as material substance in the preparation of new substances and in the preparation of forces. The body is its own commissariat, taking in the material substance in the form of proximate principles of the body, such as water, oxygen, etc.

(3) The body is a vital mechanism—that is, an organism. Now, this is the part that we must not forget. It is not correct to speak of the body as a machine, nor as a mechanism, unless we speak of it as a vital mechanism. When the body takes the material it transforms it into the vital. There is nothing that is assimilated to the body that is not first vitalized, and every process that takes place in the body is a vital process. Every lesion that we find in the body is a vital lesion in relation to the vitality,— life of the patient. For example, if a bone lesion were all the lesion that there is in the body, when you correct the bone lesion it would remain correct. Now, would it? It gets out because the vitality will not let it remain correct. When the tissues are abnormal, or when the body is depleted, upbuilding takes place from within. When the blood, for example, is changed respiration takes place by the conjoined action of a number of forces. When a febrile condition takes place the nervous system alone can step in and correct it.

If the heart is overworked it does not do any good to give anything in the way of a substance that will tone it down, inhibit or depress it. The only way you can depress the heart is through the cardiac nerve mechanism. Counterbalance in that cardiac nerve mechanism whatever is overworking the heart.

This vital mechanism of the body implies that every part of the body as an organism is supplied with blood circulation and nerve force. These are the two balancing functions in the body and are the two fundamental activities that will be continually used in the osteopathic field as corrective means. If the body is a mechanism, represents a commissariat and also an organism,

the next question is, what is health and what is disease?

1st,-- HEALTH implies perfect structural adjustment. This includes bones, muscles, ligaments, blood vessels, nerves and such. These structures are the media of expressing vital relations.

2nd,-- HEALTH implies activity adjustment.

3rd,-- HEALTH implies the perfect adjustment of the organism to its environment.

In contrast with HEALTH we find UNHEALTH. This means, or implies, the absence of, or change in any one or more of the three conditions of health.

D I S E A S E. Health does not contrast with disease. Health contrasts with unhealth, and disease is something entirely different. The comparison has been the state of health and the state of unhealth. Disease is a condition of unhealth in which we find a result, or results, of some interference with, or obstruction to, the three conditions of health, and

(a) This may be an effect of an anatomical condition, such as a bone lesion, muscle lesion, ligament lesion, etc.

(b) It may also be an effect of physiological disharmony produced by the impure and improper forms of diet that we use from time to time.

(c) This may be the result of some environmental condition, acting either as an exciting cause or a depressing cause.

The basis of the vital functions in the body is the blood circulation and the nerve force action. Blood here includes the blood and the lymph. Blood and lymph have a definite physiological composition. This depends on the replenishing of the blood from the field of nutrition. In addition to this the blood circulates through a regular system of tubes with definite vessel paths for the distribution of the blood. These tubes are regulated by definite laws in physico-physiological physics.

In addition to this the body has a regular sewerage system. In addition to the supplies that are furnished in the nutrition field the wastes that are formed in the body and by the body require to be eliminated. The large majority of diseases that we find are in this sewer field. Practically all of the febrile diseases, for example, are diseases of elimination, or of the field of elimination. (Eruptions, rashes, etc., for example, are the expressions of attempted elimination.)

In addition to the blood circulation we have the nerve forces that originate in the ganglion cells, pass out along the nerve fibers and furnish stimulus to the activity and nutrition of the body. The nerve energy is dependent upon the blood and the blood is dependent upon the nerve energy. Healthy tissue is tissue in which there is correlated the blood circulation and the nerve force. This is the reason why practically all pathological conditions are associated with interferences or obstructions to nerve and blood supply. It is this interference that represents the abnormal condition or position of tissues, such as bones, muscles, ligaments. The thickening and hardening of muscles or the connecting ligaments represents the most common lesion that produces obstruction. The same condition of hardening or thickening of soft tissues may be found anywhere over the surface of the body. These, then, are lesions that we find,-- misplacement of structure, hardening or thickening of soft tissues, alteration in the position or relation of one structure to another structure, change in the condition of the cells, in size or shape, etc.

Here the question arises, what produces these lesions?

1st: The strains, sprains, falls, etc. incident to childhood and youth are probably first grade causes.

2nd: Tension and strain produced by physical work; the undue balance of particular portions of the body in that work; the accidents that happen to the tissues in connection with posture and change of posture,-- sitting, walking,

lying, etc. These produce at first slight deviations in tissues, and later result in marked lesions.

3rd. Exposure to changes in atmosphere, climatic conditions; the attitude of the body in occupation; the over activity of certain parts of the body in certain types of work. These unite in producing hardening, thickening, contraction and relaxation of the muscles and ligaments and sometimes, if these continue, they result in movements of the bones, which alter the structural relations of the bones. These, and other changes, in the structural relations cause the blood vessels and nerves to become irritated-- subjected to varying degrees of obstruction. This obstruction, or pressure, affects the blood circulation in the spinal cord; the result is an altered distribution of the nerve supply to organs and inequality in the distribution of the blood, with resultant stagnation of the blood in particular fields, exaggeration of nerve energy, with excessive activity of particular organs.

The obstructed conditions, then, that we find in connection with lesions always involve the nerve and blood supply. That means that every lesion that we find is a lesion that irritates the nerve and blood circulation. The result of this irritation is what we call DISEASE, when it localizes itself in some particular part of the body. The irritation which we commonly call the lesion may be -

- (a) Contracture, hardening, thickening, softening (abnormal softening) of the soft tissues, including the muscles, fascia and the cartilage;
- (b) Slight changes in the relations of the hard tissues- bone, ligament or tendon-
- (c) Modification in some environmental field, the environment representing, normally, the stimulus to the normal activity of the blood and nerve force.

Either one or more of these fundamental conditions are always found as producing causes of inco-ordination in the mechanics of the body. For example, where we find a condition of contracture or hardening in the surface tissues the result is a state of peripheral tension. This produces an intensified peripheral tension which reacts on every deep organ and tissue of the body. This we find, for example, frequently as a producing cause of tuberculosis of the internal organs, hypertrophy of the liver, stomach and kidneys. Changes in the environment of dist alter the supply of materials in such a way that the organism is dependent on one proximate principle, or on a partial supply of two or more proximate principles, with the result that the body is unable to repair and reconstruct its own cells. The result is cellular degeneration and that is synonymous with tuberculosis.

Diseases, then, are found as a result of some interference with the blood and nerve supply, or some changes in the environing conditions of the body. If disease is properly described in this way, the logical method of dealing with the disease is to remove the irritation, or interference, so as to permit absolutely free play in the mechanical structures of the organism and in the vital relations of the organism. All processes in the body are constructive processes, excepting those that deal with the destruction of waste or poisonous materials. The constructive processes are in the care of the vital processes, regulated from the medulla. The destructive processes are in the care of glands which form a part of the metabolic apparatus.

The principle, then, of therapeutics is to establish absolute freedom from irritation, from obstruction and from pressure in connection with all parts of the organism. To this end we apply, as a means, MANIPULATION, directed,

1st: To the soft tissues because these are the connecting structures. These soft tissues must be first corrected before we can correct or keep corrected the bone structures; hence, the contracted, shortened and

thickened muscles must be relaxed; tense and thickened ligaments must be softened and the fascia must be free before we can attempt to deal with the hard tissues:

2nd: The hard tissues, including the bone, cartilage and tendon structures are next corrected by articulation applied to the framework of the body on the principles of mechanics. There are three principles of mechanics applied to the hard tissue structures which we mention here:

- (a) The exaggeration of the maladjustment of the hard tissue structure, in order to make the structures absolutely free for correction;
- (b) The application of extension in order to separate the maladjusted structures;
- (c) The correction of the adjustment of the structures involved by the use of a blended method, consisting of rotation, articulation, and the pull and push movement.

3rd: Correction applied to the environment of the patient. If the primary cause is a dietetic or climatic condition, or any other environmental condition this lesion must be corrected; otherwise, the organism will not resume its normal position and condition. Here we classify diet, hygiene, sanitation, etc.— anything that would be classified under this head of environment.

4th: The results of the correction of the lesion: When the principles of correction have been applied in any or all of these fields, the fluids and forces of the body are liberated from the pressure, irritation or obstruction that represents the lesion, and these fluids and forces are capable of exerting a restorative influence upon the diseased parts of the body. It is here that the body uses its native resources for curing and healing. For example, a tonic treatment consists

- (a) In the restoration of the circulation to normal
- (b) The oxygenation of the blood thru the proper lung, skin, liver, etc. action
- (c) The oxidation power of the blood thru the metabolic activity of the liver
- (d) The detoxination of the blood; that is, the purification from poisonous and waste matter thru the action of the glands, and
- (e) The elimination of the waste and poisonous elements thru the kidneys, skin, lungs, etc.

Temperature is controlled thru the establishment of equilibrium in the thermal apparatus of the nervous system and the establishment of vaso-motor equilibrium, together with proper physical activity in connection with the body by such methods of heat dissipation and radiation, conduction and evaporation, as well as the use of the sweat system. Instead of the use of cathartics in the form of substances of a medicinal nature, intestinal action may be stimulated

- (a) By the elaboration and distribution of the normal secretions of the liver and the intestines, and
- (b) By the restoration of isotonic condition of the muscles in the intestinal walls.

In other cases the cathartic action may be established by a direct visceral motor activity stimulation thru the nervous system.

In the application of these methods from the Osteopathic standpoint, the main point or principle is finding out the obstructive condition and correcting or removing the obstruction so as to open up the blood and nerve currents, to allow the free action of the heart in the distribution of the blood under regulation by the vaso-motor system, and correction of the nerve forces in distribution by spinal action. This is the principle that is applied in the Osteopathic field primarily on the basis of empiricism,

because it is only by experience that we can demonstrate clinical results. Now, we require to demonstrate that this system of therapeutics, based on adjustment, has a foundation in the physiology of the organism. The distinctive point in treatment is the application of some adjustive measure, such as manipulation, diet, climate, based on anatomy, physiology, chemistry, mechanics and psychology of the organism. The object of the application of this principle is to call into use the inherent resources of the body, so as to make the body itself actively the agent in overcoming the disease and in restoring health. This method includes

(a) Manipulation used in the restoration of normal anatomical relations, in the removal of obstructions and in the correction of the currents of blood and nerve force.

(b) In every method of nature not involving the use of anything that is foreign to the proximate principles of the body. That is, we supply to the body the raw materials that contain the elements corresponding with the body proximate principles, and allow the body to use these proximate principles in its own restoration. The only negative point here is that nothing foreign to the body proximate principles is to be supplied.

(c) By stimulating, when necessary, the physiological processes from the great vital centers of the organism. This is to be done when the structure is too weak to function the energy that emanates from the vital center. It is also to be applied when the organs are too weak to form natural chemical secretions.

(NOTE here that the stimulus must be applied Not to the muscle nor to the organ, but to the vital center, in order to compel the vital center to function out into its normal field of expression.)

The etiology of disease depends, then, on obstructive conditions, inducing disorder in the structure of the body when associated with something hygienic, hereditary- or climatic conditions- which either lower or pervert the vitality of the patient. In either case there is an obstruction of the nerve impulses, a secondary obstruction of the arterial and venous blood, a resultant inflammation, irritation and malnutrition. A neurosis is probable in the majority of cases- the fundamental condition which underlies all acute diseases- the neurosis in this case representing the weakening of nerve functioning.

According to this there is no dividing line between etiology and pathology. The obstructive or irritative condition produces directly an irritation, or inflammation, which is called pathology, but is not, properly speaking, pathology. It is HYPER-PHYSIOLOGY. The new pathology, that is, the pathology of osteopathy, is the pathology of perversion. The pathology of the older schools is the pathology of morbid anatomy. Osteopathic pathology is the pathology of physiological perversion. That is, before there are any known morbid anatomy changes, we find perversions in functioning. All cases of disease where there is a pathological condition, start out either in an exaggeration or diminution of the physiological activity, caused by some obstructive or irritative condition. This produces

(a) A change in pathology of abnormal reaction in some of the functional activities.

(b) When this perverted functioning exists for any length of time, the result is morbid changes, or changes taking place in the tissues when they begin to die. These morbid changes have been called morbid-anatomy pathological, but they are really morbid anatomy. The true pathology is the pathology of the abnormal reaction.

Here we come to the subject of BACTERIOLOGY. Some Osteopaths have said that bacteria do not exist. Bacteria do exist, however, both benign and malignant. Bacteriology, however, does not present the problem of the existence or non-existence of germs. The problem of bacteriology is, What place do the germs occupy in the field of disease? Before the germ can find a lodgment in the body, the body as an organism must be in a weakened or depleted condition. This condition is due to a previous perversion of function, followed by neurosis, and this, in turn, followed by malnutrition. There are, therefore, three stages in pathology before we come to bacteriology. These three stages are all hyperphysiological stages. Bacteriology, then, appear in the field of malnutrition as the results, effects or products of perverted bioplasmic processes, and perverted nutrition. As a matter of origin, the germs originate in degenerated bioplasm. It is a truism in the field of biology that life without life is impossible. The life of the germ is the life of the cell of the body, perverted before it comes to the cell stage of life. The type of the germ is determined by the malnutrition. Therefore, we must differentiate in bacteriology between two important facts:

First: The origin of germs is in the degeneration of the unit forms of life.

Second: The development of the germ in the field of nutrition in which development takes place, determines the type of bacteria.

In fighting against germs, then, we must take account of these two facts:

1st: In fighting against the origine of germ diseases we must fight them in their pre-bacillary stage-- that is, in the stage of bioplasmic formation. In this field of origin the principal physiological fight must be carried on in the attempt to establish the upbuilding processes of the body.

2nd: In fighting against the micro organisms in their particularized formation-- as tubercular germs, pneumococci, etc., we must remember that these are effects of a malnutritive process and that the only way we can fight against them is in the field of nutrition. Hence,

(a) We find that pure blood is the only perfect germicide that there is.

(b) Healthy tissue cells represent the most active phagocytic agents in the destruction of germs.

(c) A readjusted organism, including the entire structural activities and environment of the body is the only favorable battle ground for the destruction and elimination of the germs and their toxins.

According to this the two great problems of modern bacteriology that remain for demonstration are, First, that the human blood is the only normal germicide for the human subject, and Second, that the readjustment of the organism on its normal basis is the only possible foundation for the development of pure blood.

An illustration of this may be found in tuberculosis. The most prominent field in which tuberculosis is found is the pulmonary field. The lung tissues receive their nerve supply principally thru the pneumogastric and its branches. Obstruction to, or irritation of this nerve supply cuts off the normal trophic impulses from the pulmonary field. Upon these trophic impulses the lungs depend for their healthy vitality. Before tuberculosis of the lungs is possible, therefore, there must be a neurosis and probably a degeneration in the pneumogastric nerve field. Following this neurosis we find a degeneration in the membranes in the pulmonary field; that is, the nerve communicates neurotic influence to the epithelial structure in which it terminates. The cough and sputum are expressions of this - the former the irritation, the latter the exudation and expectoration. The result is a pathological condition of accumulated exudations; the secondary result in the pulmonary field is a degenerative state of lungs. It is in this stage and in this

field that we find the lodgment and the development of the tubercle bacilli. The explanation of the osteopathic cure of cases of tuberculosis is to be found in the removal of the obstructive conditions involving the nerve supply to the lungs. The result of this is,

1st: To check the symptoms of tuberculosis, namely cough, expectoration and night sweats.

2nd: These symptoms in reality represent the stage of perverted functioning of the lung and its accessories. During this stage the tissue field is in a state of preparation for the degenerative stages of real consumption.

3rd: If these conditions, namely, the symptoms of tuberculosis, and the degenerative changes are, or can be, controlled, then there is a possible nutritive upbuilding of the lungs to the point at which the lungs are capable of resisting the action of the tubercular germs. If this can be accomplished then the organism will throw off the germs and tuberculosis will be cured.

A confirmation of this point we find in the writings of Dr. Mays on Pulmonary Tuberculosis. He says: "The lesion is not one originating in the local tissues, but in the nervous system; all forms and phases of pulmonary disease are constantly called forth through the instrumentality of vagus disintegration."

Behind the pathology of the tubercle formation lies the perverted nerve action, and behind this lies the obstructive or irritative conditions that produce the abnormal functioning of the nerves and expose the neurotic tissue to micro-organic infection.

Bacteriology, then, if properly studied and investigated, may contribute to the development of the field of perverted physiology in pathology. The net result of this view of pathology gives us a definite proposition that we may lay down as follows: The only pathways along which nature can transmit impulses or currents of vitality to the different organs and tissues of the body are the nervous system. Neurology teaches us that every organ and tissue is connected in some way with the spinal cord:

(a) Either thru the spinal nerves, or their branches, or

(b) Thru the sympathetic system and its branches.

In this way there is established a visceral connection between the spine and every portion of the body. Hence, the failure to receive vital impulses at any point in the body, establishes always a specific lesion or obstruction or irritation. In line with this we will find that congestion and inflammation and degeneration (the three great chapters in pathology) are primarily due to a failure of venous drainage outside the central nervous system, or cerebro-spinal fluid drainage inside the central nervous system. That is, disturbed circulation with a previous obstructed condition of circulation, is the contributory cause of all the effects that we find in pathology. The irritation, the obstruction, the pressure are due to some type of lesion in the structural sense, or in the activity sense.

If what we have said is true, nature is attempting to create conditions within the organism antagonistic to foreign bodies and foreign substances. This is in line with the proposition laid down by Hippocrates, which practically amounts to this: That nature always tends towards the normal and tends to preserve the parts of the organism while life lasts, by creating normalizing tendencies within the organism. The part that Hippocrates did not point out is this, that the tendency towards the normal is sometimes valueless on account of the existence of obstructions. It is here that the function of the physician comes in, to remove those conditions and allow nature to establish her normalizing tendencies. The object of therapeutics, whether applied by nature or otherwise, is to keep



the field of nature as free as possible, so as to allow the absolute activity of the vital processes. In attempting to establish this absolute freedom we may summarize as follows, the work of therapeutics:

1st: To contract, relax, and to relax contracted soft tissues.

2nd: To adjust the hard tissues, namely the bone and cartilage and tendinous structures in their interrelations, because these represent the framework and, as such, represent the solidity of the structure of the body, as well as the functions of the fluids and forces as they pass thru the inter-related structures.

3rd: To soothe the irritation of over active tissues by inhibition, always applied thru the nerve centers.

4th: Arcuizing the torpid or inactive tissues by stimulation applied only thru the nerve centers in the same way.

5th: Establishing the free and uninterrupted currents of vitality by adjusting the entire organism to itself and its parts and adapting the body to its environment, and vice versa.

### DEVELOPMENT OF OSTEOPATHY.

The history of Osteopathy began practically when the architecture of the body was first formed. Every attempt that has been made to open up the secrets of the organism, by dissection, or otherwise, has been a preliminary step in the preparatory stage of Osteopathic history. Many investigators in the fields of anatomy, chemistry, physics, physiology and anthropology have been contributors to the primary chapter in its history. The fundamental principle of the preparatory stage is, "Back to nature". Consequently every student of nature has been a contributor. We mean by this that Osteopathy did not appear all at once as a new science. Osteopathy rests on the facts that have been accumulated during a period extending over one thousand years, and representing the results of the most careful study by the greatest scientific investigators in past history. What we mean is, that these scientists made Osteopathy possible and, therefore, the finished product, namely, the science, is, in part, due to their work, and is in the direct line of succession in scientific progress.

The second stage in the history of Osteopathy is represented by various movements that helped to lead up to, and even suggested, the osteopathic principles. In other words, we find for probably two centuries certain fundamental facts isolated from one another in the fields of physics, chemistry and physiology, which facts when brought together, became the foundation principle of Osteopathy.

#### -I-

The first place is due, undoubtedly, to the BONE-SETTERS."

Tradition tells us that bone-setting existed among the nations of antiquity. In Germany, Bohemia, England, Scotland, Wales, New England, the Carolinas and the Virginias, we have a direct history of expert bone-setters. These were men absolutely divorced from the medical profession, who used the method of bone-setting as a means of curing many of the so-called incurable diseases. Most of the bone-setters have worked in obscurity. None of them were literate and hence our knowledge of their methods is a matter of history, the history in this case being in the hands of the medical profession. They were working, however, along lines distinctly tending to Osteopathy. The fundamental principles of bone-setting were two:

(a) Articulation of structures that had become rigid. This articulation among the bone-setters was limited to the large joints.

(b) They applied the principle of mobility. This was demonstrated

by the fact that the technic of bone-setting movements, or treatment, was rapid, quick movement joined with extension and, in some cases with an added jerk or a forcible tear- not to the point of rupture.

The greatest original work of Dr. Still was practically that of bone-setting. The importance of this is brought out in a statement in the "NATUROPATH", of December, 1902. After criticising the claim of Osteopathy that whatever belongs to the field of nature belongs forms a part of Osteopathy, the writer says:

"The Osteopathy first taught by Dr. Still did not include dietetics, hydrotherapy, suggestion or any other naturopathic measures. The formulator and sponsor of a system is its founder, not its followers, and if you are true to your founder, you must adhere, technically, at least, to the doctrines of the good old bone-setter. The readjustment of skeletal malformation or malposition, and the stimulation of certain nerve centers- that is all that Osteopathy can claim to be, originally, etymologically, rationally or practically."

In opposition to this the foundation of the discovery of the science is not synonymous with its development. No system of philosophy, religion or healing was ever sent down from Heaven ready made or fully evolved. Every system had an origin, a development and a regular evolution.

Undoubtedly Dr. Still was originally a bone-setter. He acquired adeptness in setting dislocations and found that as a result of replacement the limbs were restored to normal nutrition. But Dr. Still differed from the bone-setters in this, that he did not stop with the idea of dislocation. This idea suggested to him and his followers a principle, namely, that the articulations of the body, with free articular mobility, characteristic of every joint in the body, furnishes a basis for healthy and diseased conditions of the body. The body, in other words, is ultimately to be regarded as a perfectly articulated mechanism:

- (a) With the cruder articulations at the divisions of the four extremities with the trunk.
  - (b) With finer articulations in the more delicate jointure of the vertebrae, and in the jointure of the ribs and spine. (This point the bone-setters knew nothing of.)
  - (c) Still more delicate ligamentous and ligamento-muscular articulations are found in the attachment of the soft tissues to the skeletal structure of the body.
  - (d) Thru an organ articulation in relation to every other organ. (These points found no place in the system of bone-setting.)
- The cruder and finer jointures (A) Provide for the free mobility of every tissue and organ structure, built into the mechanism of the body.
- (B) Furnish branching nerve connections from the great cerebro-spinal nervous ganglionic centers to the different organs controlled and regulated in their activity in sympathy with the general nervous economy.
- (C) Furnish pathways and channels for the inflow and outflow of fluids from the more distant parts of the body to the great central life organs, such as the brain, heart and lungs.
- (D) Make it possible for the brain to distribute these vital forces and fluids and to regulate the vital processes all over the body by means of vibratory waves that stimulate the normal tonic state of every tissue and organ of the body.

Hence, we find that all the organs and tissues of the system sustain a close relation to the most delicate articulations of the skeletal framework. Hence, the slightest displacement or alteration in the articulations-osseous, ligamentous or muscular- interferes with the blood vessels and nerve fibers passing to and from the brain to the body, and vice versa. The result of this interference is obstruction of the life forces that pass out bodyward

from the brain and pass in brainward from the body. The effects produced by this interference or obstruction are found to be obstructed nutrition, obstructed heat production and the obstructed distribution and derangement of energy production. That is DISEASE.

That is an idea that was never dreamed of by the bone-setters, but which points the final way to the ultimate proposition of Osteopathy, that an organ or part of the body cut off from its normal heat, energy and nutritive supplies becomes abnormal, falls into a diseased condition and may actually die.

The correlate of this is found in the proposition that the replacing of the misplaced structures, the relaxing of the contracted condition of the tissues overbears the interference, removes the obstruction and enables the organs or tissues to receive their normal heat, energy and nutritive supplies, with the restoration of the organ or parts of the organ to their normal condition.

Bone-setting, we must admit, represents an important principle in therapeutics, but only as a starting point. (see Dr. W. P. Hood's Book on Bone-setting.) He describes the success of the bone-setter to breaking up adhesions and overcoming, by rapid flexion or extension, or both, obstruction to free joint mobility. The motion of the joint is limited in certain directions and it is the overcoming of this limited movement that marks the principle and success of the bone-setter. In other words, Articulation. In locating such conditions of dislocation the bone-setters depended on the principle of tenderness, usually around the inner side of the joint. The articulation of the bone-setter consisted in:

- (a) Locating the tender point
- (b) Placing the thumb over this tender point and applying strong pressure
- (c) Grasping the distal portion of the limb and rotating it on its axis as freely as possible to overcome muscular resistance.
- (d) Flexion and extension applied in the direction of greatest resistance.
- (e) The reverse movement until adhesions were broken up, usually with a "clicking" sound.

## -II-

The second place is due to the Ling System. The first history attempted to systematize mechanical therapeutics, was made by Dr. Peter Ling. Fencing and gymnastics, of which he was an adept, and which he used himself to regain his own physical vigor, suggested to him the idea of certain movements with physiological results could be used in the treatment of human ailments and in developing body integrity. The result was that after years of study he formulated a system of gymnastic therapeutics which he divided into four branches:

- (A) Education. Movements designed to give the individual control of his body.
- (B) Medicine. Movements for the palliation and cure of disease.
- (C) Military. Movements designed to enable the individual to place under his control some weapon of defense and offense.
- (D) Aesthetic. Movements designed to give expression to the inner feelings, emotions and thought.

The Royal Gymnastic Central Institute was founded at Stockholm, in 1813. Recently it has become a Government Institution. Peter Henry Ling was first President, its founder and the man who developed all its fundamental principles. The medicinal part of the system was bitterly

opposed by the medical profession in Sweden, but Ling and his disciples persisted in the elaboration of the system and in 1831 Ling, who was not a medical graduate at all, was made a member of the Swedish General Medical Association. Rothstein and Neumann have published treatises on the system of Ling. The treatise of Rothstein is in German, and that of Neumann in Swedish and German. These two men introduced the system of Ling into Germany and the followers of those two men are the representatives of modern mechanical therapeutics in Germany.

Branting, Georgi and Brandt have been the three great exponents of the system of Ling. The Central Institute at the present time has a course of three years, with a postgraduate course of one year for medical practitioners. The Ling System as practiced today in its integrity is known as the Kellgren Manual System, of which we have at the present time an excellent exposition in the English language, entitled the "Elements of Kellgren's Manual Treatment", by Edw. F. Cyriax.

The Ling System is not Osteopathy, but the emphasis it lays upon movement as a curative factor clearly paves the way for articulation in connection with the principle of adjustment of the parts of the body to secure perfect structural integrity. One point of note in the Ling System is as an advance in bone-setting that the Ling System recognizes vertebral lesions and thus changes displacements and maladjustment from the larger joint field to the smaller joint field.

### -III-

Another movement of more than significance as a preparation for and practically the foundation of Osteopathy was that represented by Hilton in his work on "Rest & Pain". The principle is practically the same as that of the bone-setters, with the additional idea that irritation of the spine at the point corresponding with the nerve supply of the organ or organs affected, sensations of pain at or around the vertebrae, sore spots around the spinal column indicating spinal lesions, represent the main contributions of Hilton and his followers to the Osteopathic idea. Hilton's idea of pain as the expression of the location through the nerve supply of the cause of pain is the basis of diagnosis. In a case of severe abdominal pain, increasing in the erect posture on both sides just above the pit of the stomach, Hilton, in 1851, found the disease associated with a slight displacement between the 6th and 7th dorsal vertebrae, and pressure upon the vertebrae produced the pain in front.

Dr. Martyn, in the British Medical Journal of 1864, explains why dorso-intercostal pain is limited almost entirely to the 6th, 7th and 8th intercostal spaces on the left side. Dr. Embledon, in 1870, presented a paper to the British Medical Association in which he explains the shoulder pain associated with the liver in relation to the pneumogastric origin in the hepatic plexus developed through the spinal accessory nerve in connection with the trapezius muscle.

### -IV-

The final preparation for the Osteopathic principle of adjustment is found in the reaction against drugs. There has been going on for centuries in systems, theories and writings that are noted in the history of medicine. The non-orthodox systems represented, especially in Leyden, Hahnemann and Samuel Thomson, and their followers, a reaction against certain drug forms. This reaction, however, was not complete because they accepted certain other drug forms. The reaction complete has assumed a much more marked form in the writings, sayings of more recent writers. Dr. Osler, for example, represents the principle of what is called Medicinal

Nihilism. This principle is represented at the present time by the Johns Hopkins School of Medicine. Recently Dr. Osler emphasized this principle in an address to the students at St. Mary's Hospital in London. His doctrine is expressed in these words: "He is the best Doctor who knows the worthlessness of most medicines." Here the reaction is purely negative. That is, the valuelessness of drugs is recognized. There are other men, however, who recognize a positive side. For example, men like Dr. George S. Keith, of Edinburg, give this negative reaction a positive aspect. For example, Dr. Keith says, "I have all along treated cases of influenza on the old method of leaving them absolutely to nature." He does not stop there in his "Plea for a Simpler Life" and "Past of an Old Physician". He exposes much of the teaching and practice of the medical profession, declaring, as his experience after fifty years of practice, that much of both the teaching and practice is wrong. As a historical character he is of considerable importance. He lived himself through two phases of therapeutics:

1st: The depletion idea. (Letting out the blood).

2nd: The tonic, or stimulating line of treatment.

He studied and visited all of the Hospitals and other systems in Continental Europe, and he finally came to the conclusion that the drugging system was absolutely useless. He commends rest, especially to the stomach; warmth, water, air and time to recuperate the organs, especially the nervous system. He pointed out, from his own experience, that tenderness is found between the first and second ribs in Angina Pectoris and is relieved by friction applied locally with the hand. In the conjoint edition of his works, he emphasizes the importance of mechanical treatment.

Another writer of considerable importance is Dr. Bernard Roth, of London. He confirms the Osteopathic idea of correction applied in the cases of curvature and tubercular spine by means of the upbuilding of the nutritive processes alone, without any external help. (Treatment of Latral Curvatures of the Spine, by Dr. Bernard Roth, is a standard work on the subject.)

Dr. M. F. Pilgrim, in his work on "Mechanical Vibratory Stimulation", emphasizes the principle of rational therapeutics and supports very strongly the idea of mechanical treatment alone, basing his ideas on the contributions of the leading physiologists of the Nineteenth Century.

The entire field of Naturopathy is a protest against the drug system. It is not Osteopathy, but we recognize that it is cultivating the field and preparing the ground for positive scientific truth. Arthropedics and massage are also important factors in this field.

These scattered references to history will make plain that many of the fundamental principles of the Osteopathic Science were developed by predecessors, just as anatomical facts were brought out by the anatomists of past ages. Even when the principles were developed, however, their application was not understood, or was misinterpreted. The facts, namely the knowledge, was there in the anatomical, physiological and pathological fields, but the practical application was absent. Hence, we must recognize that the work of Dr. Still was not in reality the discovery of Osteopathy, but the discovery of a single scientific fact, namely, "Disease is the result of physiological discord in the functioning of the organs or parts of the physiological laboratory of life. The cause of disease can be traced to bony variations from the base of the skull to the bottom of the foot; in the joints of the cervical, dorsal and lumbar vertebrae, the articulations with the sacrum; also the arms and the lower limbs."

The Fourth stage in the history of osteopathy is the development of the idea of Osteopathy into a definite principle and a systematized method of healing. The later development of Osteopathy centers around the facts, first that Osteopathy is not a series of principles, but a single principle, namely, ADJUSTMENT. Second, that on this foundation of adjustment a system of therapeutics can be built up that is co-extensive with the fields of disease and the healing art. The chief feature of osteopathic work in its origin was the adjustment of bones. This will always remain one of its prominent characteristics, because the skeleton is the framework. On this foundation the development of Osteopathy has applied the principle to the entire system, including,

- (a) The adjustment of the body to itself and its separate parts.
- (b) The adjustment of the body to its environment of diet, hygiene, society, physical surroundings, etc.

To state the principle of Osteopathy as it has been stated, namely, that disease is the result of anatomical abnormalities followed by physiological discord, is as absurd as the statement of the older medical schools. On this supposed principle osteopathic therapeutics is limited to the cure of diseases in which the abnormal parts must be adjusted to the normal. This principle of therapeutics is equally absurd, because anatomical abnormalities represent only one field in the etiology of disease. The trouble here is that the osteopaths do not understand the principle of Osteopathy. The principle of Osteopathy is not bone adjustment, but body adjustment. Hence, any maladjustment affecting the body, or any of its parts- structural, environmental or toxic- falls under the osteopathic etiology, and any means of correction- manipulative, dietetic or surgical- that tend to correct the adjustment and thus elaborate the forces and fluids of the body so as to normalize the body, belong to the osteopathic system. Drugs are entirely eliminated because these represent elements foreign to the proximate principles of the body and not in line with the therapeutics of increased resistance. The only exception to this is to be noted in the case of germicides, antidotes and antiseptics, because these substances are instrumental in removing vital toxics and septic conditions that prevent the organism from maintaining, or returning to, its normal condition.

This is not a new principle in Osteopathy, although it has been contended that Osteopathy is an absolutely drugless system. Dr. A. T. Still recognizes this himself. He recommends the inhalation of camphoridin for a smallpox patient and the vaccination by the use of cantharidin as a preventive of smallpox. He recommends the use of glycerine and water in cases of diphtheria. These are substances which belong to the field of medicine, and to be just to ourselves, as well as the practitioners of other systems, if we use these as antitoxins or antiseptics, it is simple honesty to admit that we do use them.

Like all other changes in the progressive development of a science, Osteopathy represents an evolution of the nature of improvement in the healing art. Osteopathy began like every other new movement- in a negative form. Later on it took on its positive form. The negative form was skepticism of the old method of treatment; the new form, representing the science in its completeness, represents not the failures of the older schools, but the principle and practice of the new school itself. Hence, we find that the discovery was made at the first that many so-called diseases are produced by misplaced, relaxed or contracted conditions of the body. Following this it was found that there were certain results, namely, the interference with free normal currents of fluids and forces, producing a disturbance of equilibrium of the fluids and forces that are essential to health.

In the application of the principle of adjustment it was found necessary to normalize the structure. Following this septic, toxic and other conditions were found which prevented the normalizing structure from expressing the vital forces characteristic of the organism. Hence we find that these toxic, septic and other conditions require to be removed, in order to allow the structure to become free expression of the vital forces. This does not mean that Osteopathy, or its principle, should be mixed with any other method or system of therapeutics. The fact is, that the principle of Osteopathy cannot be combined with the principle or principles of the other schools. The method of Osteopathy is entirely different from the methods of other practitioners. At the same time, in the dietetic, hygienic and septic fields there is common ground which must be covered by all schools, if any honest attempt is to be made to master disease and to remove it. Osteopathy, therefore, stands on the basis of its fundamental principle- ADJUSTMENT. In elaboration of this principle-

I. Osteopathy is opposed to the use of everything that is foreign to the body, both as an organism and as a mechanism, whether found in the form of substances foreign to the proximate principles of the organism, or in the form of methods antagonistic to the mechanics of the body.

II. Osteopathy favors the use of every means that may be called native to the body, both as an organism and a mechanism, and all the mechanical principles that are in harmony with the body mechanism.

III. Osteopathy recognizes the necessity of sanitative and hygienic measures to prevent the spread of disease and to make health most agreeable to those enjoying only a partial measure of health.

IV. Osteopathy does not believe in the use of foreign serums, foreign cultures of virus, toxins or other diseased substances, just as it does not believe in the injection of blood, because every such subject required by the body is manufactured in the individual body, and if not so manufactured within the body it represents a foreign substance which the body itself must remove in order to be of any service to that body.

V. Osteopathy believes in operative surgery as a last resort, when some portion, or portions of the mechanism become a hazard to the organic life. The final test, then, for operative surgery, osteopathically, must be hazard to the body life. Surgery is identical in basis, then, with Osteopathy, and not a coordinating system. The surgical principle, according to Osteopathy, is not the problem of the removal of the organ, or the removal of a part of the structure of the body, but it is the removal of a part or organ that has become dangerous to the body, and it is to preserve the organic life that the part, or organ, is removed.

VI. Osteopathy takes its stand on the principle that the etiology of disease is to be traced to the abnormal adjustment of the anatomical, physiological and environmental conditions of the organism and that to cure the disease, the cause, or causes, must be removed by the substitution of normal for abnormal adjustment of the structure functioning and environment.

VII. Osteopathy does not believe in the principle of absolute immobility, whether by the use of the plaster cast, the splint, or otherwise, because mobility is the principle of life and irritability is the primary property of all bioplasm. Immobility means the obstruction to, or interference with vitality, hence it means ultimate death. This principle of mobility, in opposition to immobility, is applied in the case of fractures, strains, sprains, etc., , relative immobility only being applied where there is a solution of continuity, requiring the approximation of the parts in order to maintain vital continuity for the purpose of restoring nutritive integrity, and until such integrity is restored.

In the history of the medical science thinking was largely along the lines of the external side of human life. For example, in dealing with febrile diseases, the main point was to attempt to check fever in the hope that by checking fever activity might be aroused, vital resistance stimulated. From our point of view, just as in the homeopathic system, we look at the internal side, the problem being to eliminate disturbing factors that appear in the form of conditions, or annoying symptoms, such as tenderness, pain, irritation, hypersensitiveness, etc. The older method, or methods, represented measures that were largely, if not altogether palliative. That is, temporary relief was given to a patient under certain conditions without respect to the ultimate purpose served by temporarily relieving the condition. Permanent relief, however, is what we are after and this can be gained only by a purpose that looks for deeper causes and attempts to relieve those deeper causes by natural means which aim at the removal of the conditions that act as irritants, obstructions, interferences, etc.

Anatomy has emphasized for centuries the fact that the tissues of the body assumed certain definite structures- structural forms- but neither anatomy nor physiology had tried to demonstrate the correlation between the structures. Physiological research in the field of the nerves and muscular systems has hinted at times at the problem of life, namely, vital control over the form and relations of the tissue structures. Only a few of the physiologists have attempted to explain that the problems of physiology are really the problems of life expressed through tissue forms. Some physiologists, like Foster, have tried to demonstrate that underlying each function there is a vital accommodation and this vital accommodation is the basis of what we call processes. It is this principle that the osteopathic system has taken hold of, namely, the interpretation of living tissue in terms of life, not in terms of matter, nor in terms of simple structure. It is not sufficient for us to say that structure is related to structure. We must solve the problems of the body organism from the standpoint of energy, because it is energy that underlies the origin of tissue forms, a special form assumed by each particular body and its parts and the capacity for work in each particular organism. Deformities in structure and maladjustments in the relations of structure are evidenced of change in potency of nerve and muscle force, rather than expressions of inorganic substances or poisonous elements, or of forceless matter. The greatest problem of the human body, then, is the problem of force or energy.

- I. In its relation to the body as a whole. Here the organism mechanism of the body becomes an organism under the influence of the vital forces.
- II. In the field of the tissues and organs of the body. Here, as Marey has demonstrated, the form of each particular structure, including the tissues and organs in the different grades of animal life, is determined by the type of activity or the form of energy that is exhibited in the animal life.
- III. In the field of human activity the type of activity is determined by force, plus the particular development of the structures of the body.

The tendency to emphasize this principle, as we have seen, has appeared for at least a century. Previous to that science was not divided or dissected into parts. In the times of Hippocrates, and in the middle ages, there was but one science and every form of science required to conform to the single science; hence, we find the idea of vital adjustment appearing time and again in the history of the healing art. Recently this principle has been emphasized and the foundation of the newer methods of healing.



Sir Frederick Treves makes the statement that the time is not far distant when the bottles on the doctors' shelves will be reduced to a small number and that then, on account of the new idea of life, resort will be had to simple life,--suitable diet, plenty of sunshine and fresh air,-- as the only methods of living. "People should look forward to the time when they would leave off the extraordinary habit of taking medicine when sick when it would be as anomalous for a person to die of scarlet fever, typhoid fever, cholera or diphtheria, as it would be for a man to die of a wolf's bite in England."

Dr. Saleeby, in an interesting book entitled "Worry, the Disease of the Age", in discussing the physical cause of worry, recommends, first, refraining from the use of drugs, and second, "If there is a real cause for worry he must remember that it is unnatural to worry, and set himself to removing the cause."

Here we have the keynote both of the negative and the positive aspects of the Osteopathic system. According to these writers health is natural; unhealth is unnatural and, if in health, the living body is a delicately constructed living organism whose parts operate in harmony to develop strength and maintain normal functioning. The only way to restore health, which is natural, is constructively to adjust the body to itself and its environment. The body strength may be weakened if the body is injured, for example, by lacerations, bruises, fractures, mechanical pressure or irritation. These are the causes of the weakness. If they are the causes then remove the causes in order to restore normal strength to the organism. The foundation of normal health in the body is laid in the physiological conditions of the organism. We must remember, however, that these physiological conditions are not only gross in the structural field, but also microscopic in the cell field. These relations among the tissues and cells must be normal if the body is to be normal.

Another proposition that we must lay down is this: Any variations from normal can exist without an adequate cause, and the search for these causes represents the fundamental field of etiology, whether that etiology is to be found in the mechanical, chemical, dietetic or surgical. The conditions that are found in the organism must be such conditions as are compatible with the adjustment of the entire organism to itself and to its surroundings. Hence, the problem of therapeutics is not a problem of expertness in bonesetting or muscle stretching, but it is the problem of using what we find within the organism as a means of forcing the organism into its proper relations with itself, with other organisms and with its environment. If we can work out such a comprehensive principle as a basis of a system of healing, then we have a consistent foundation on which to build a system of therapeutics. We must remember, however, that a system of therapeutics represents a scientific sum of knowledge compatible with the details of the system itself and capable of comparison with other systems, in order to demonstrate that this system is better than the other systems.

The foundation principle, as we have said before, is the principle of adjustment and this can be applied to the organism as a whole and to all the relations which the organism sustains both to itself and to everything with which it comes into contact. The question is sometimes asked, how can the said sufficiency of the organism fail? The answer to this question is, that it may; but if the self sufficiency of the organism falls from the side of its capacity to restore or repair, or from the side of its capacity to take and use what is supplied as the crude materials of life, then the self sufficiency of the organism cannot be replaced by anything that can be supplied to the system.

In formulating and discussing the philosophy of Osteopathy, we must recognize as our first point, the continuity of thought and of history. In other words, a new science does not mean a new beginning for thought, nor

does it mean an isolated scheme, but simply a break for the time being in the chain of events that we call history, so as to make a starting point for a new movement. In this new movement we find both a negative and a positive side. The negative side represents the breaking away from the current of old thought and is generally found in connection with skepticism and criticism and sometimes the absolute negation of the older propositions. The positive side represents the new thought itself and its application to the new field that it claims. The history of medicine is practically the history of contention and warfare among individuals and sects in the healing art. These controversies in the history of medicine ~~is~~ practically throw considerable light on the methods that were used at the different periods of medical history. In the healing art, from its historical side, we are dealing largely with fancies and ideas rather than with facts and nature. This is the reason why scientific research is practically limited to modern times. By modern times we mean the history of the healing art in its relation to the laboratory, the dissecting room, the clinic and the hospital, because these are modern agencies in the development of the facts that underlie the science of healing.

During the middle ages, as well as in ancient times, scientific method, if there was any, was exactly the opposite of our modern scientific method. That is, instead of fact there was abstract idea and from the abstract idea reason was supposed to evolve the facts. In this process of reasoning, as a result, facts were absent most of the time.

The foundation of medicine is to be traced to two writers—Democrite and Lucretius. These two writers reduced the essential principles of all things to a simple concourse of atoms. Around this idea the entire medicine of ancient and mediæval times is grouped. Hence, we find in the middle ages the study of medicine is limited practically to what is called nominalism—the study of words and study of ideas, out of which developed,

1st: The principle of symptomatology

2nd: Occult nominalism gave origin to the pharmacology of modern times, because it was essential, or supposed to be so, on the part of the physician to retain the knowledge of medicines and their qualities in his own mind. The medicine itself from the supposed fact side, operated on the material structure of the organism.

The first departure from Vesalius, the first student of modern anatomy. This was followed by the development in physiology under Harvey and Haller, who may be said to be the two founders of the physiological conceptions of the body. While the other sciences represented by physics, astronomy and so on were advancing, the science of medicine was standing still, largely because of its occult principle, namely adherence to the particular language of the so called founders of medicine. It was only when the modern physiologists were able to invent a new nomenclature and the anatomists established the names of the structures of the body, that medicine took on its new form. The modern scientists realized, ultimately at least, that the science of healing alone could be based with other advancing sciences, and it was this principle, or theory, or idea that gave origin to the newer movements in the 18th and 19th centuries that emphasized chemistry and physics as foundations of the healing art. The osteopathic science enters the field as one of the claimants to develop the healing art from the side of physics and chemistry. That is, as we said before, it represents the summing up of all of the scattered principles that had been developed during the two previous centuries.

The exactness of science in the physical and chemical field was the stumbling block to the development of medicine at the time of Bacon and since that time. Medical diagnosis was supposed to be impossible unless it could be put into the language of the older sciences. Since we began to realize that language has nothing to do practically with the

development of a new science, we are able to develop the science on its own foundation principles. Physiology and pathology have both of them adhered to the nomenclature that was in vogue in Harvey's time and in Haller's physiology. While adhering to the terminology, the modern physiologists and pathologists, however, have failed to develop the principle associated with vitality that is found in both of these writers. This is the reason why both physiology and pathology are tending to, if they have not already become purely materialistic. Physiology is based on chemistry rather than on chemistry-physics and vitality. Pathology is based on morbid histology rather than on perverted chemistry, physics and vitality. These are points that the osteopathic system must not overlook because, if our pathology is exclusively the pathology of misplacement, or of disorder and derangement in the nervous system, based on the pure mechanism of the body, then our pathology is as fundamentally wrong as the pathology of the older schools of medicine.

Pathology and physiology have their starting point in life. The physiology of the different structures of the body is the pathology of life functioning in vital structures. The pathology of disease is the pathology of certain structures that are abnormal, but these abnormal structures are still functioning in connection with vitality. All disturbances, then, in the organism and all derangements in the parts of the organism must be associated with some grade of life. If we interpret all pathological changes in relation to a changed life or changed life process, then we are able to apply our method of treatment to restore not structural integrity, but, ultimately, functional activity. In doing this we can formulate scientific principles and apply these to the body in the attempt to correct the disturbances in the circulation, to restore the normal condition of the blood and other fluids of the body and to establish the co-ordination in the nervous system path that is necessary to normal life expression.

The starting point, then, of the osteopathic philosophy must be life, and this raises the question as to what life is? The answer to that question has been attempted by philosophers in all ages. Our view of life is entirely from the physiological side. In other words, we are not concerned with a philosophical idea of life that will satisfy metaphysics. Life, according to physiology, is associated with certain phenomena. These phenomena are the expression of force—vital, physical and chemical—in relation to certain media that we call the structures of the body. From this point of view life is entirely secondary, or rather a manifestation of something that probably we know nothing about. It does not matter whether we are able to explain the philosophy of life in the deeper sense, or not, if we are able to explain life itself as it appears to us from the physiological side. The life that we live then, is a life of phenomena related to our bodies as the material media of expression. The psychic side of life is a side that will be discussed in another field.

Taking life, then, as represented by the phenomena that are associated with the body organism, the different factors in life represent the physiological processes. It is in this sense that we trace the starting point of the osteopathic system to this point, as expressed by Dr. Still, that "A disturbed artery marked the beginning, to an hour and minute, when disease began to sow the seeds of destruction in the human body. The rule of the artery must be absolutely universal and unobstructed, or disease will be the result."—From the Biography of A. T. Still, Page 218.

The plan, or method, of therapeutics was entirely a secondary consideration and even ~~less~~ the method of therapeutics is entirely different from what it is represented by most of the present day Osteopaths. "All the remedies necessary to health exist in the human body. They can be administered by adjusting the body in such condition that the remedies may naturally associate themselves together."

In regard to the etiology of disease "the cause can be found and does exist in the limited and excited action of the nerves only which control the fluids of parts, or the whole, of the body. All diseases are mere effects, the cause being a partial or complete failure of the nerves to properly conduct the fluids of life." These represent the three fundamental principles of Dr. Still. To these three principles we add a fourth, namely, The adjustment of the body to itself, to its parts and to its environment, as the rational means of establishing normal conditions within the body, such conditions, when normal, representing health to that particular body.

In the application of this principle of adjustment we find the entire field of therapeutics, that is, applied mechanics or physics, applied chemistry and applied physiology. These represent the fundamental fields of therapeutics. The practical application of these applied sciences represents, first, the technique that may be invented or used in demonstrating structural adjustment; Second, The technique that is associated with the adjustment of physical forces and the finer forces of the body (vital forces) on the plan of physiological co-ordination. Third, the technique of chemistry insofar as it bears upon the subject of diet, - the destructive and constructive processes that take place within the body in connection with the metabolic functions. Here we have the principle of the non-vital converted into the vital and, when vitalized, actually incorporated into the substance of the body. The principle to be applied here is that of chemical affinity or physiological compatibility.

Our tentative definition of Osteopathy is as follows:

Osteopathy is a system, or science, of healing that uses the natural resources of the body as curative agents or means. For this purpose certain measures are used:

(a) In the adjustment of structural conditions and relations that have become abnormal in order to insure the preparation and distribution of the fluids and forces of the body.

(b) To secure the co-operation of functional activities in promoting harmony within the body organism.

According to this definition Osteopathy (a) is a system, or science, of healing; (b) an independent system of healing; (c) It uses only the natural resources, excepting (aa) In toxic cases in which it is necessary to use an antidote to remove or overbear the toxic condition; (bb) In surgical cases calling for operative interference. This includes antiseptics, anaesthesia and sedative action in cases of pain.

(4) The measures used in Osteopathy, and the purposes that are kept in view in the method of treatment are all based on the application of the fundamental principle of ADJUSTMENT. This is the reason why the system is independent-- because it is based on the differential principle of therapeutics, namely the adjustment of the organism, on the basis of the natural resources of the body, including anatomical structure, physiological activities, psychological processes and mental attitudes and environmental conditions, such as diet, hygiene, sanitation, climate, etc.

(5) We must not forget that symptomatology is an important part of the osteopathic system. Many Osteopaths, particularly in the among the older Osteopaths, say that there is no value in symptomatology at all. We have said before that behind pathology lies perverted physiology. This perverted physiology foundation represents symptomatology. That is, the obstructive or irritative condition of physiological functioning represents the symptoms of the abnormal. The symptoms are of value osteopathically, because a symptom is not a pathological, but a physiological, expression of the condition of vital manifestation in the body organism. Symptoms represent, therefore, a part of the true condition of the patient and we

are not able to determine the actual conditions without taking into account these expressions, or signs. That which is going on in the organism, namely, pain, is never a pathological condition, and therefore cannot be correctly dealt with by suppression, for example, by morphine or any other hypnotic substance. Pain is always a physiological expression of the demand for help, expressing in this way the needs of the vital force of the organism. In line with this we find two types of pain:

(a) Pain that is defined as "The prayer of a nerve for pure blood"—that is a blood condition (See "Pain" by Corning.)

(b) Pain is also due to over stimulation, that is, it represents, or expresses, some need, or needs, of the organism. If these needs are not attended to serious consequences result.

The osteopathic principle of dealing with both of these types of pain is to remove the cause either from the blood side or from the nerve side, or both. Among the reasons why symptoms require to be attended to by the Osteopath we mention the following:

(a) Symptoms are expressions in the tangible, perceptible or observable forms of deeply seated conditions; that is, these symptoms are the only available means of knowing that is taking place in the deeper structures. This is a principle that is based on Head's Law in physiology.

(b) Symptoms are the only means that we have to enable us to differentiate between diseases. In some cases it is essential that we be able to make such a differentiation in order to treat the disease. This may be explained, or illustrated, for example, in the differentiation between the toxic and non-toxic types of typhoid fever. These two types call for different treatment and the differentiation can be made only on the basis of symptomatology.

The same thing is true in differentiating, for example, between gallstones, hepatitis and enteritis; or in differentiating between typhilitis, appendicitis and enteritis.

(c) Symptoms represent the life activities. That is, they are the voice of the vitality in regard to the normal or abnormal conditions of the life activities. Anything that is a part of our being cannot be overlooked, particularly in dealing with disease, because in all cases of disease there is much that is insidious in its action. The abnormal expressions are so pronounced in most cases that they represent an actual modification in the physiological activity. This is the special value of symptomatology in enabling us to interpret the relation between physiology and pathology.

(d) There is also a close relation between symptomatology and etiology, etc. which explain the symptomatology, and symptomatology will interpret, etc. Hence, the true symptomatology gives us the means of explaining the relations between the maladjustment on the one side and the modifications on physiological conditions in the body life on the other. Here we have a wide field in which to explain and interpret symptomatology through the

(a) Request of the nervous system,

(b) The continuity of tissue

(c) The interrelation of organs and structures

(d) The close relation between form or structure on the one hand and function or activity on the other hand.

For example, in a particular case we require to explain the relation of numbness as a symptom to some particular obstructive lesion, or lesions causing it. Perhaps the largest field of symptomatology has relation to the different types of headache, which may be explained reflexly, sympathetically, through the blood field or through the nervous system.

In attempting to follow out this subject we do not follow the symptomatology as the medical writers and diagnosticians have done, namely, to set forth in detail every symptom that bears any connection

with each type of disease. Our plan of procedure is to attempt to classify the symptoms in such a way as to explain the classes of symptoms in relation to primary and secondary etiology. For example, in typhoid fever practically all the symptoms may be explained in relation to the two types of typhoid fever, namely, vaso-motor typhoid and viscer-motor typhoid fever. Better still we can explain typhoid symptomatology by referring all the symptoms to the predominating characteristics in the particular case, for example; there are practically but three types of symptomatology in typhoid fever:

1st: Symptoms that are associated with the nervous system as a whole due to the inco-ordination of the two nervous systems. In this case the line of treatment, symptomatically, will be co-ordination of the two nervous systems.

2nd: Symptoms that depend upon toxemia. These are always traceable to a primary secondary, and a secondary excretory condition. In the line of history symptomatic treatment will deal with the excretory condition first, and then the secretory second. Here the sympathetic system must be appealed to because it has to do with the solid substance of the secretions.

3rd: Symptoms that are traceable to the disturbance of the thermic apparatus. In this case there is the involvement of a limited field of the nervous system and all the remedies in the particular case are to be traced to the disturbance in this particular limited field.

#### -VI-

In the field of therapeutics the osteopathic system is dependent upon physiology for the explanation of its principles. Manipulation is not of value unless the manipulation can be transformed into something else. In other words, the mere manipulation of bones, muscles, ligaments, etc. has no therapeutic value in itself. This is the reason why massage never became a science because no attempt has ever been made to use massage, except as an adjunct of some other system; that is, to help secure some therapeutic object which another method of treatment was trying to accomplish.

In the osteopathic system, scientifically applied, manipulation is a means, and a physiological means, based on this principle, that the manipulation physical is converted in, or by the organ, into its physiological equivalent from the functional or activity side.

Physiology teaches us that there are four methods of stimulation, - the word stimulation being used here in the general sense, to represent some change of energy, either

(a) Above par, representing acceleration, or  
 (b) Below par, representing inhibition. If we take stimulation in this sense we find that it may take place

(A) Chemically, by the using of some substance or chemical drug. The objection to this method is that by the use of a chemical substance there is exhaustion without replenishing.

(B) Thermally, by the use of heat and cold, which are relative treatments, the heat and cold being applied at different degrees. In this case the heat or cold is applied to the local system, the heat or cold calling forth a specific action or reaction in the one case, and a specific action with a general reaction in the other case.

(C) Electrically, or magneto-electrically. In this case electricity is used as a means of influencing the system in such a way as to produce a direct action, or an indirect reaction. The only value, in my opinion, of electricity is to remove from the organism an excess of electricity, when the body has such an excess of electricity in disease.

(D) Mechanically. The mechanical method is nearest to normal because it operates (1) Without exhaustion; (2) It stimulates and arouses the native forces of the organism to activity. In this case, and when so

applied the mechanical treatment, given from the therapeutic side, is converted into some physiological condition inside the organism. Hence, the basic idea of this mechanical principle of therapeutics is ORDER and vital mechanism in the body organism. Order is determined in the body

(a) By the framework in the adjustment of bone, ligament, muscle and other structures. The adjusted relations of these structures is the foundation of framework.

(B) All the anatomical relations and mechanical activities of the body depend on the proper adjustment of the framework. Here the operation of the framework in connection with activities and relations depends on force. The vital force of the animating principle and the other physical forces that operate through the structures of the body.

(c) The framework of the body, from the standpoint of force, is operated on through the application of the mechanical principle, for example, we find illustrations of leverage, articulation, jointure, pressure, (both fluid and gas), etc. This means that the complete application of these principles of mechanics represents the basis of vital force activity. When the body is abnormal- as all lesions are vital lesions-therapeutic means to adjust all the different structures within the organism can be found in these physical forces. In this work which nature does for herself, provided the organism is normal or nearly so, the first law of nature's therapeutics may be stated as follows:

I. Nature always tends towards the normal, preserving as long as life lasts its normalizing tendencies. This normalizing tendency is the power of the organism to react to stimuli. This tendency towards the normal, however, is of no value so long as obstructions exist, whatever the nature of the obstruction may be. Hence,

II. As an aid to nature, and in order to allow nature to assume its normal functioning, the obstructions to this tendency towards normal must be removed. To accomplish this certain things require to be done.

The main object is to make the body absolutely free structurally, and from its force side, in order that the body activity may be absolutely unobstructed. By structure of the body we mean here not only the gross anatomy of the body, that is, the tissues and organs, but also the microscopic anatomy, namely, the cells.

In the work of adjustment, representing osteopathic therapeutics, we include

(a) The contraction of the relaxed tissues and the relaxation of the contracted soft tissues

(b) The adjustment of the osseous, ligamentous, cartilaginous and muscular structures, not as structures only, but in their inter-relations, so as to establish the perfect interarticular mobility.

(c) The soothing of irritated or overactive tissue conditions by inhibition applied to or thru the nerve centers.

(d) The arousing or torpid or inactive tissues by stimulation of the acceleration type applied to or thru the nerve centers.

(e) The establishment of free and uninterrupted currents of vitality, that is vital force, by adjusting the entire organism to itself and its parts, as well as adapting the body to its environment of diet, air, climate, sanitation, sociology, etc.

(f) The elimination of all toxic and waste elements, so that the nutritive conditions may be absolutely free from toxic vitiation. This applies particularly to the cells.

III. The pathways along which nature transmits the currents of vitality to the different organs and tissues are represented by the nervous system in its neurons and through connecting ramifications.

Every organ and tissue is connected in some way with the spinal cord: (a) Through the spinal nerves; (b) Through the sympathetic system, which establishes its visceral connections everywhere by means of its ramifying branches. The sympathetic life, or accelerator life, ramifies into and is co-ordinated with the inhibiting life, or balancing life, of the central nervous system, in connection with the minute rami communicantes along the spine. Hence, the failure to receive vital currents of this accelerator or inhibitory type at some particular point of the body will always establish a specific lesion or obstruction or irritation. The therapeutic value of this principle is that the therapeutic pathway is the pathway of least resistance. This explains the oft repeated question: How do we know that a treatment applied at a particular point will reach the part that is affected?

The answer is, that physiology determines this without our interference. The open pathway is the pathway of least resistance; the open pathway is the pathway to or from the organ that is disturbed and this open pathway is the pathway along which stimuli will pass as a result of treatment to help the organ or tissue that is weak.

Congestion, inflammation and degeneration are due, primarily, to the failure of the venous system of drainage to perform this duty. This is the result of a disturbed circulation and depends, in turn, on some obstructed conditions produced by muscular, ligamentous or osseous pressure. The removal of this pressure to establish normal drainage, and if normal drainage is kept up, health will be restored. The explanation, for example, of the osteopathic cure of cases of tuberculosis is to be found in the removal of the obstructive conditions that affect the nerve supply to the lungs, thereby gradually checking such symptoms as coughing, expectoration and night-sweats, which are often taken as indices of consumption. These symptoms, in reality, represent the stage of perverted functioning during which the tissue field is in preparation for degenerative changes such as we find in real consumption. When these conditions are controlled there is a nutritive upbuilding of the lungs to the point of resistance to the action of germs and the result is that the patient is cured. The meaning of this line of reasoning is that the field of osteopathy is the field of lesions, provided, however, lesion is defined properly. For our purpose at the present time, a lesion may be defined as follows:

A lesion represents any variation from the normal in the adjustment (a) of any of the structural parts of the body; (b) Any co-relation in the activities of the organism, or of activity plus environment. The basis of co-relation is the physiology of activity of the physical and anatomical union of cell and neuron elements, such as we find in the nervous system. This represents what we call co-ordination.

According to this definition of lesion, we have two fields of therapeutic action- (a) Structural maladjustment, and (b) Inco-ordination of activities. In the therapeutic field we find (a) Structural adjustment and (b) The co-relation of activities.

The structure field applies to the anatomy of the body- more particularly the anatomy of bones, muscles and ligaments, but here the anatomy is that of the living body- not the dead body. The lesion in this field is the change in the adjustment of the co-adapted or co-related structures, or in the articulated structures. We must remember from the standpoint of living anatomy, that without articulation adjustment would be an impossibility. Hence, the basis of all anatomical adjustment comes to be that of articulation, and this applies both to the tissues and the organs. The activity applies, not to the vital processes here, but to the principle of mobility that is fundamental to all living structure. All tissue that is alive has a movement of some kind. This applies to the single cell or to the groups of cells. We classify this movement as rhythm or arrhythm, the former applied to the rhythmic changes of the visceral organs, such as the heart, liver and spleen; the arrhythmic applies to the peristaltic movement found in the intestines, blood vessels, and brain.



In some organs, like the brain and the heart, we find the combination of the two types of movement—rhythmic and arrhythmic. Back of this movement of both types lies mobility and back of mobility lies the activity. Underlying the activity is the general vitality. The therapeutic basis, then, of the Osteopathic System is to be traced out in this way: Its field is two-fold:

- (a) That of structural adjustment, and
- (b) That of correlation of the activities.

But the only basis of therapeutic action is to be traced to the vitality, because the vitality must use any means that are employed by us to restore the organism to normal. The therapeutic basis of the structural adjustment is articulation. The therapeutic basis of activity adjustment is co-ordination, or correlation. Subordinate to this we find:

- (a) Tissue mobility represents the rhythmic or the inherent characteristic of movement in the tissue or organ.
- (b) Articular mobility represents the motive and the locomotive relations of the different parts of the body.

VITALITY. Underlying activity is vitality. This raises the question "What is life, or vitality?" To answer this question we must trace out the relation of life to the phenomena that we find in the body in order that we may get a connected series of phenomena to make up our body life. The metaphysical question of life is not the problem of physiology. Life, as known to us in the physiological sense, consists only of certain phenomena or manifestations. This does not deny metaphysically that there is an underlying life of which the phenomena of life are expressions. The phenomena represent the body experiences. Granted then, that life represents phenomena, what is the relation of lesion to this life? Lesion relation to the phenomena of life may be traced out as follows:

As lesion, as defined, is any variation from the normal adjustment of the body, that is, from the standpoint of life, a lesion represents some modification either in mobility, or in "articulability". This implies a modification in the activity, or the activities, that stimulate mobility and articulation, and this, in turn, implies any variation in the distribution of vitality, or in its expression. The vitality-force side of vitality represents the normal principle that is present in every part of the body, especially associated with the cerebral cortex, because this is the great center of the expression of all vital action. On the other hand, impulses (sensory or motor) imply, First, the existence of vitality, and Second, the existence of activity as a stimulus.

Hence, in all expressions of nerve life there is found vital action. What then, do we know of this vitality, or vital force? All that we know is that it exists, because of its manifestations. Critics have said that this is no proof of life, neither is it any proof of chemical affinity, although all chemists accept this proof as sufficient to establish affinity as a principle in chemistry. All life implies a preceding life and the basis of this preceding life is vital force. This vital force is distributed ~~throughout~~ throughout the body in connection with the vital processes, which the physiologists class the functioning. These vital processes are centralized in the medulla centers and they depend for their expression and for their functional actions which they perform on activity. All these activities, however, depend, as we have said before, on mobility and articulation. Therefore, the primary form of all such activities as we find in the body is the rhythmic or peristaltic action. Any modification in these activities is liable to result in the lack of correlation and it is this disturbed correlation that produces DISORDER, which represents LESION from the physiological side of the organism.

According to this theory, or view, lesion, representing a variation from normal adjustment, has an application both to the anatomical and to the physiological. In the anatomical it applies to the structure; in the physiological to the activity. The main point, however, is that in every lesion, if the body is alive, both of these conditions are implied.

The physiological basis of the structural maladjustment is practically the ultimate basis, because physiology represents life. This physiological basis, then, is a modification in the field of mobility, or a change in the field of articulation. The physiological basis of the activity in incoordination is the physical, anatomical and physiological correlation of the neurons inside the nervous system. The neuron represents the unit of the nervous system, the nervous system, as a whole, consisting of a mass of inter-related neurons. In order to understand the foundation of this lesion we must remember that the origin of the neurons is in the nerve corpuscle that we find in the embryonic life as an amoebic life floating in the neural canal. These corpuscles are laden with cells which ultimately settle down in particular areas of the cerebrospinal system. When the nerves settle down they develop by ramifications. Hence, the idea of the original neuron is that of a cell with a projecting trunk and branches. When this neuron is completed, we find:

- (a) The original cell which is the nerve corpuscle.
- (b) The neuraxon, or the axis cylinder, representing the prolongation of the cell outside of itself.
- (c) The dendron representing the branching processes from the neuraxonic substance.
- (d) The dendrite representing the minute ramifications of the nerve substance.

In establishing communication between the different neurons we find that the dendron represents a stable anatomical communication and the dendrite represents an unstable physiological communication. The latter represents a most minute microscopical action between the neuron elements in different parts of the nervous system. This is the physiological basis of the coordination of activity, such as we find in the normal nervous system, and also of the incoordination, such as we find in the abnormal nervous system. Hence, this represents the minute lesion field in connection with modifications or changes in activity. This is the central point in the Osteopathic system of therapeutics.

Osteopathy then represents a new view of the science of therapeutics, a new method of diagnosis and a new technique in practical application. Osteopathically it means the discovery of certain causes in the field of maladjustment and the correction, or removal of these causes as causes or conditions of disease. Pathologically it represents conditions that may be summarized as follows:

- (A) Maladjustment of the bone, cartilage, muscle, ligament and cell structure.
- (B) Disturbances in the fluids of the organism, including the blood and lymph and the other secretions of the body.
- (C) Derangements of and disorders in the nervous system, including its centers, ganglia, plexuses and fibers.
- (D) Maladjustments in the fields of correlation outside of the body organism. The therapeutic field from the side of

technique implies correspondingly:

- (a) Scientific manipulations that aim to correct the maladjustments in the bone, muscle, ligament, cartilage and cell structure fields.
- (b) Scientific manipulations that aim at rectifying disturbances in the circulation of the body fluids, and restoring normal conditions, especially in the blood circulation field.

- (c). Scientific manipulations that use the nervous system with its fibers, plexuses, ganglia and centers with a view of correcting disordered nervous conditions, deranged correlations, toning up the general system, or its parts, promoting trophic conditions of the muscles, nerves, and stimulating a normal correlation of the psychic with the physiological and vegetative functionings of the human system.
- (d) Any means that may be used in harmony with the body activities and the body constituents to correct the interrelation of the organism with its surroundings.

According to this view the entire body is for functional activity. There is nothing wasted or superfluous and there is no room in the body for abnormal conditions. Hence, the slightest deviation from the normal structural adjustment involves some interference with organic action and may give rise to disturbances in the neural or muscular systems. Hence, the ideal of therapeutics is a body organism whose bone framework is perfectly fitted, whose muscles are perfectly attached to the bone structures, whose blood is absolutely freely circulating in every part of every organ and tissue, whose nerve force represents the assimilating and life giving principle of the entire body and whose organs and tissues are all working in harmony on the basis of oxygenation and oxidation to supply nutrition to the entire organism.

The laws of nerve energy underlie the physiological correction of the relations of the different parts of the body. So far as the body is concerned, sympathy is the basis on which nerve force operates. This sympathy, as it applies to the principles of nerve force, furnishes the basis on which the body is able to apply to itself all of the physical, chemical, physiological and psychic laws that have a bearing upon health.

From this point of view, as we said before, the body is not only a perfect mechanism, but also a perfect organism, organized in such a way as to establish harmonious relations between all the different parts of the body, between the body and the not body. On this principle the functionings and relations of the different parts of the mechanism apply the principle of chemistry, mechanics, anatomy, physiology and psychology. All laws that are discovered and applicable in these fields belong to the Osteopathic System.

We say that within the body are found all of the natural remedies. This, however, must be limited by the added statement that the materials must be supplied which the bioplasmic and metabolic processes can make use of in order to establish a normal equilibrium in connection with the different parts of the organism. The body organism, in other words, has the power of using the resources of nature in the production of remedies. These remedies are produced:

- (a) Bioplasmically - in the form of bioplasts. This is the only material which the body can use either as nutrition or as medicine.
- (b) Metabolically. Processes which result from metabolism give us the basis of the formation of the internal secretions.

Modern physiology has demonstrated that the foundation of physiological life from the nutritive side is some form of internal secretion. In fact, there is absolutely no nutritive process that is not based on some form of internal secretion. These internal secretions are formed only by metabolic process and as the metabolism of the entire body cannot take the place of the metabolism of the body in question; foreign secretions have no place in the economy of nutrition or medicine.

have no place in the economy of nutrition or medicine for the human body.

The basic principle of Osteopathy is that in a human organism in perfect health, every tissue and structure performs its part without interruption, the structure representing the framework on which the other tissues are built and to which they are attached. It is in this sense that Osteopathy makes use of the framework of the body, including the bones, muscles and ligaments,

1st: As a means of establishing landmarks for physical examination, and

2nd: As a means of restoring maladjusted conditions of the body.

In this sense the structural parts become the basis of manipulation, the osteopathic manipulation representing the medium of therapeutic action, both in reaching the bioplasm condition and the metabolic condition, involving circulation, secretions, etc.

As an appendage to this fundamental principle of therapeutics, nothing that is extraneous to the body is necessary, outside of the raw materials which are essential for the repair of tissues already existing and for the creation of new tissues in connection with the general disintegration and dissolution that is continually taking place in the body bioplasm. Osteopathic therapeutics incorporates within itself the principle that correct diet and oxygen represent the essential basis of systematic construction and reconstruction. This means that food, in sufficient quantity- not to excess- and with sufficient variety, together with muscular exercise, normal respiration and proper elimination, represent the non-manipulative side of osteopathic practice. The field of elimination must not be overlooked because the end products, or waste elements, that we find in the body are two-fold:

First: The products of bioplasm. Under this we find toxins, degenerated bioplasts, or germs.

Second: The end products of metabolism. Here we have the general waste of the body. Both of these end products are to be eliminated if the body is to maintain its normal conditions.

The success of the application of this principle depends on the fact that the nervous system presides over all of these processes. That is, there is a complete establishment of harmonious action on the part of the nervous system in relation to all the tissues and organs of the body,- the restoration of circulation in the organic fluids and the thorough operation on the vital forces, together with the removal of impediments to articulated action to the structures represents the essential principle of therapeutics. Human nature represents a perfect organism, variations from this degree of perfection depending on individual, heredity and environmental conditions. The individual conditions represents the structures of the cells, tissues and organs of the body.

Disease is regarded from this point of view simply as a derangement or disorganization. In order to restore it normally there must be the elimination of obstructing elements but also the establishment of order on the basis of individual conditions subject to the laws of heredity and environment. According to this, both mental and physical conditions belong to the osteopathic field, because the application of the principles of natural law bear on mind as well as on body. If every disease is traced back through symptoms, signs or pathological conditions to the primary cause, then in locating the cause we can render assistance to nature with a view to reestablish

- (a) The harmony of the forces of nature.
- (b) The adjustment of structural relations.
- (c) The establishment of normal functional activity in the nervous, circulatory, digestive and excretory systems.

Here we have the sum total of the normal foundation that we can lay down therapeutically for a healthy condition of body and mind. Obstruction has been placed largely to the displacement or dislocation of some structural portion of the body. We must not forget, however, that this is only the exciting cause of a condition of pressure in connection with the nerves or blood vessels and that the result of this pressure is the shutting off of nerve force and nutrition from a part of the body. In some cases we find a twisting or curvature of the vertebrae, causing direct pressure on the nerve substance, cutting off the circulation and resulting in a degenerated condition of the nerves and muscles. Physiology has taught us that degeneration takes place as a result of cutting off a nerve from its trophic center, the degeneration taking place away from the center of trophic influence. This pressure may result from dislocation or displacement, or even from the existence of a tumor mass in the tissue, or as a part of the tissue.

In order to restore normal conditions it is absolutely essential to remove the cause because it is producing the degeneration. The influence of the pressure is based on the physiological principle, that when a nerve is mechanically stimulated with sufficient force to alter the nerve substance, we find a physiological condition. The tenderness found in certain parts of the body in connection with pain illustrates the physiological principle that the white sheath of the nerves is furnished with a special nervous system called the nervi nervorum periphericorum, representing specialized sensory fibers in connection with pain sensation. In this way we can understand why not only is there found pain in the typical sensory nerves, but also in the motor nerves, because all of the nerve paths that have the white sheaths are endowed with a special sensibility in connection with this special pain system, partly as a protection to the nerves from dangerous conditions and partly as a signal of such interference with normal nerve function.

Having outlined the principle and the theory of Osteopathy as a science, there are two great problems at the present time in the osteopathic field:

- 1st: What is the standing of the osteopathic profession, and
- 2nd: What is the fundamental foundation, or preparation, that is necessary to preserve the standing of the osteopathic profession?

The first question is to be solved in the light of our relations, First, to disease. Here the question is, what diseases can we deal with and what benefit can we confer on those who are afflicted by diseases; that is, what therapeutic principles can we apply? Here we have a definition of therapeutics given us by Hilton: "By therapeutics I do not mean to imply the action of drugs, but rather the influence of what I might venture to call natural therapeutics."

Our therapeutics is based on the principle of the power of nature to repair. As Hilton says "There is implanted in man a recuperative power from the accidents and mischances of his precarious existence."

Hilton speaks in one place of growth as an anti-type of repair, indicating the innate capacity of the tissues to repair themselves. By growth and repair, then, we understand those bioplasmic and metabolic processes that involve

- (a) The destruction of all elements that are detrimental to the system- to the organism, and
- (b) The development of other elements that form the basis of the upbuilding process in the body, these processes going on continuously in every organ and tissue of the body.

Wherever and under whatever circumstances disease may exist in relation to the body, we believe that this principle can be applied to its recuperation and regeneration.

Second. This question must also be solved in the light of the relation of the osteopathic science to the general public. Science is of value, especially in its health aspect, only insofar as it promotes public health. If then, the application of this principle of recuperation and regeneration applied to different types of disease bears upon the public health, then the osteopathic science is entitled to recognition as a therapeutic system.

Third. This question must be solved ultimately in the light of relation to law. It is a well known maxim that whatever is illegal and unconstitutional must be ultimately swept aside. The constitutional basis of science in its relation to the public health is the proposition that we lay down under Number Two. According to this the osteopathic science must assume the constitutional position; otherwise it will combat with the law and seek its own destruction. Legislation is never for the benefit of a class, but for the benefit of the whole community. It is on this ground that we frequently attack the constitutionality of so-called medical legislation.

The true relation of medicine to the State, or to the People, implies the fact that medical legislation must be for the benefit of the People. Added to this is another fact that the State has the right, on the ground of public policy, to lay down certain requirements that are necessary on the part of those who shall be employed by the State as its physicians in State or National offices. This does not, and never can destroy the right of the People freely to consult whatever physician they desire in sickness.

In medicine used in the science of healing, there are different schools, and the constitutions of practically all countries forbid discrimination in behalf of certain persons. Whether the statute laws of the particular states carry this out or not, the constitution is above all statute practice. For example, the constitution of Great Britain provides that the privy council shall break any attempts by an examining body to impose restrictions as to any theory of medicine or surgery on candidates for examination.

The statute laws of Missouri, Indiana and Illinois provide that nothing in the medical laws shall authorize the Board of Health to make any discriminations against the holders of genuine diplomas under any system or school of medicine. The same statute law, at least in the first two named states, declares that Osteopathy is a system, or science of healing. The statute is simply an interpretation by the legislature of the constitution. The statute can only confer a privilege; the constitution gives a right. Privilege can never conflict with, or over-ride right. Therefore, if the osteopathic system is a science of healing, it has a right constitutional right to protection. That is, the constitution recognizes it as a school of medicine. Medicine here is used in the wide sense of the term to include the whole art of healing, and the laws upon which the art is based. This means that, according to the constitution, we must claim to be a school of medicine, and in order to get our rights we have simply to demonstrate this fact. The statute in every state of the United States is on record against discrimination in favor of one science as against another. The constitutional right, then, belongs to those who practice what the statute law will recognize as a system.

In an opinion delivered by United States Justice Field, in the Supreme Court of the United States, in 1889, maintaining the constitution-

ality of the health laws, we find the constitutional recognition of the possibility of new modes of treating disease; "the same reasons which control any imposing conditions upon the compliance with which the physician is allowed to practice in the first instance, may call for further conditions as new modes for treating disease are discovered."

Here we have the recognition of the principle on which the osteopathic system, as a system, can receive full recognition. When the Osteopaths began to practice at first they were opposed by the law and by the different boards of health. To meet this condition legislation was secured in some states and judicial decisions were secured in others. The object was to protect the practice of Osteopathy, as it was then known, but the mistake that was made was to declare the practice of Osteopathy not the practice of medicine.

The first statutory recognition of Osteopathy was gained in Vermont in 1896. Missouri, in 1897, passed a bill recognizing the graduates of a course of four years or five months, osteopathy being defined as a system, or method, or science of treating diseases, but at the same time declaring it not to be the practice of medicine. In 1901 two important changes were made in legislation. In that year Montana and California created State Boards of osteopathic examination, providing for the examination and license on the basis of qualification. In the same year Wisconsin passed a law recognizing Osteopathy as a system of practice and providing for the recognition of the osteopathic physician as a physician, with all the rights and privileges of other physicians.

Among the states that recognize Osteopathy in the same form as Wisconsin, are Indiana and Kentucky. California, New York, Texas, Delaware, Oregon and Utah have representations on the board of medical examination. Colorado, Massachusetts and Maryland exempt Osteopathy entirely from the provisions of the health laws. Independent boards of osteopathic examination exist in Vermont, Missouri, Michigan, Tennessee, Montana, Connecticut, Minnesota, New Mexico, Oklahoma, Arkansas, North Carolina, Idaho, South Dakota, Nebraska and Ohio.

In Ohio the board of examiners is a committee of the medical board. North Dakota retains the original law. Iowa, Kansas, Arizona, South Carolina, West Virginia, Virginia, Wyoming provide for the granting of certificates to practice osteopathy by the state board of medical examiners. In Illinois there is no statutory recognition of Osteopathy, but those who practice any other system or science of treating human ailments, who do not use medicine internally or externally and who do not practice operative surgery, may get a certificate to treat human ailments, on examination of the state board of health.

Osteopathic recognition from the judicial standpoint is the real keynote to this status as a system. When the question of Osteopathic status came before the Courts, there was no precedent to stand on. Osteopathy appeared at first on the defensive, charged with practicing medicine under the laws governing the practice of medicine. Some Courts decided that Osteopathy is the practice of medicine, others that it is not, according to existing laws. The position of the Courts in the latter case was that Osteopathy was a new system in terms of the decision of Justice Field, and that as a system not in existence when the laws were passed, the laws, as statutes, did not apply to the system, but the constitution did apply to the system. It was in this sense that the Courts decided it not to be the practice of medicine, namely, according to existing laws.

The Supreme Court of Kentucky granted a perpetual injunction against the State Board of Health restraining it from interfering with, or prosecuting Osteopaths for practicing their profession, because there was

no statute giving them a basis for such prosecutions. In the opinion of the Supreme Court we find the following: "Osteopathy is a perfect system, having the approval of skilled and scientific men and schools and colleges in which its doctrines are taught."

The Supreme Court of Ohio sustained the defendants in a case brought against them that there was no cause for action, declaring that Osteopathy is not the practice of medicine under the law, the attempt to regulate Osteopathy by statute being prohibitive and unconstitutional.

The Supreme Court of New Jersey declared that an osteopathic physician, whose treatment of his patient consists simply of manipulation of the body, does not violate the provisions of the act regulating the practice of medicine. The Court of Errors and Appeals in New Jersey confirmed this decision and the Supreme Court of North Carolina declared that the practice of Osteopathy is not the practice of medicine and surgery and no license from the medical board of examination is required. The Mississippi Supreme Court has confirmed the same point on the same grounds.

On the other hand the Supreme Court in the State of Nebraska declared the practice of Osteopathy to be the practice of medicine. The Appellate Court of the State of Illinois, and the Supreme Court of Alabama declare that the practice of medicine includes all persons who diagnose disease and prescribe or apply any therapeutic agent for the cure of the same.

The explanation of this difference of opinion is to be found in the fact that all the decisions in the separate states have been based on the interpretation of the statutes or laws. In Kentucky the statute was construed to apply only to those who practiced when the law was passed. The Supreme Court decision is based upon the constitution and provides that new systems, as well as old systems, are entitled to recognition on the ground that, as a system, if a system, they represent a principle of practice, and such a principle of practice, if applied to the entire field of disease, represents the foundation of a profession, the members of the profession being competent to deal with all types of cases.

#### THE FIELD OF OSTEOPATHY.

Osteopathy represents a principle, not a set of principles. This principle is so extensive that it is capable of application in the entire field of practice. The application of the principle extends, therefore, to every possible type of disease. In the early history of the osteopathic system the application of the principle was made entirely to chronic conditions. Its history in development has been largely the history of utility in its application. That is, the application of the principle to such cases as appeared in the field of practice. Certain limitations were placed upon the osteopathic principle by its original defenders. This was largely due to the fact that their practice was limited and, consequently, the application of the principle was limited to their field of practice.

If we have a principle, however, that is entitled to be recognized as a therapeutic principle, no one can place any limitations on the application of the principle. This is practically the history of science in all its departments. Newton's first law of nature, for example, was simply the starting point in the evolution by the inductive methods of the laws of physics in the field of nature. These laws of nature have been gradually widening ever since the days of Newton. The discovery of Osteopathy was simply the expression of a new fact based on a new principle in the department of therapeutics. Hence, it was the starting



point of investigations in which the application of a principle to different types of disease. The application of this principle in these fields has demonstrated that there is no type of disease that is not amenable to this line of treatment. The principle, as we have said before, is that of Adjustment and based, as it is, on the application of Order to the human organism, whether normal or abnormal, it becomes the basis of diagnosis and also of treatment. Osteopathy, therefore, represents not a negative, but a positive therapeutic truth.

It is true that in the early history of Osteopathy there was much of the negative aspect, found principally in skepticism regarding the value and use of drugs and unnecessary surgical operations. This skepticism, however, simply led to the negation of hitherto new means in the therapeutic science. That is, it laid the negative foundation for a constructive philosophy and a constructive practice of health. In other words, the method or the means used up to date in the previous history of medicine was given the significance of and made synonymous with the principle of medicine. This is brought out very clearly in the recent use of materia medica, theory and practice, and therapeutics.

In a published statement recently from Dr. J. W. Holland, Dean of the Jefferson Medical College in Philadelphia, this statement is made: "Anatomy, chemistry and physiology are minor branches in the medical curriculum. The major branches are materia medica and therapeutics." In other words, materia medica and therapeutics are supposed to represent the sum total of the science of medicine, whereas anatomy, physiology and chemistry are the major subjects. Therapeutics is the practical application of whatever principles are found in or underlying these major subjects.

In the early part of the present century in the medical schools of Europe, there was a chair of the principles of medicine, otherwise known in some of the other schools as the institutes of medicine. In these University Medical Schools the principles of medicine represented physiology.

This presents the true foundation of any therapeutic system, namely, the physiology of the human organism. There is some danger in the osteopathic field of making the same mistake. The vital mistake that was made in the early history of Osteopathy was that of making the manipulative removal of a lesion synonymous with Osteopathy. Here we do just exactly as the medical schools are doing—place method and means in the place of principle. That is, it represents a false view of Osteopathy and so general was this false view that the medical profession regarded Osteopathy simply as rubbing or manipulating bones, or correcting lesions of some kind. That is, Osteopathy is made synonymous with manipulation.

The point that we note here is that we have practically made the same mistake that we charge to the medical profession, of putting effect in the place of cause, including entirely the fundamental etiological principle, while emphasizing the incidental or accidental sign of the fundamental condition. In other words, we have emphasized the method while overlooking the principle. What, then, is the principle of Osteopathy?

As we have said before, the pivot around which everything else in Osteopathy revolves is that of Adjustment. The best definition of Osteopathy, briefly, is as follows:

- Osteopathy is a system with one central general principle, namely,
- (a) The diagnosis of disease from the standpoint of interference with vital activity in the structural and environmental fields of the body.
  - (b) Its therapeutics is based on the correction, or removal, of these

abnormal condition in the organism and its environment, so as to permit an organ to return to normal in vital activity.

The therapeutics of Osteopathy, then, bases its entire treatment on the principle of the inherency and self-sufficiency of certain vital forces and resources within the organism itself.

The older therapeutic principle was that "the vital processes were to be directly modified by an extraneous stimulation added to the organism to increase the lagging functioning, repress excessive functioning, or correct perverted functioning. The vital activities are the automatic expression of the inherent forces of life itself, made manifest thru the physical structure."

Disease, according to our view, relates to one of three things: (a) The structure as the physical expression of vitality. (b) The activity as the expression of the vital force. (c) In the environment. Disease has nothing to do with any the source or character or any one or more of these fields. According to this view.

(A) Vital force is the physical animating principle of life, life manifesting itself in the physical phenomena, because the physical is all that we know of life. Vital force, then, lies back of all the physical phenomena.

(B) The vital force itself cannot be increased or decreased, excepting so far as its distribution through organic structure may be altered. Hence, the field of vital manifestation is the entire structure of the organism, the different activities of the organism and the surroundings of the organism. The state of vital health represents a condition in which this vital manifestation is uninterrupted and unobstructed in the organism, or in any of its parts and unmodified by environing conditions, such a temperature, moisture, climate, gases, etc.

The state of unhealth, on the other hand, represents that condition in which the vital force is interrupted or obstructed in such a way by the structure of the organism, by certain of the activities of the organism, or by environment or environmental changes, so that normal vital manifestation is impossible.

The Osteopathic System, then, is based on the fundamental proposition that the curative and restorative forces are to be found in the protective functional activities of the body, and that the sum total of therapeutics is to be found in this, that we can assist in the removal of conditions that disturb these protective functional activities in their free and active operation.

Some Osteopaths have claimed that stimulation and inhibition do not belong to the osteopathic system. It is admitted by everyone that a part of the environment of the body, as a structure, is represented by the number and the kind of nerve impulses; and it is also admitted that it is possible to produce a change in the stream of nerve impulses beyond the need of the organism in a state of disease. Stimulation and inhibition represent the use by the body, or by some means brought to bear on the body, of the protective functional activities of the nervous system and its parts. That is, inhibition, like acceleration, is a vital phenomenon, not a vital process. Inhibition is one of the environing manifestations of the structure of living tissue, namely, reflex or automatic response or reaction to environing stimuli. Cut off these stimuli that underlie vital phenomena of the nerve apparatus and the life of the structure is an impossibility. Inhibition and acceleration are, therefore, environing phenomena of structure and they underlie all of the rhythmic changes that take place in the organs of the body.

These represent, if normal, the normal stream of impulses. If abnormal, a change in the stream of impulses that depends on the lack of or excess of environing stimuli. Therefore, in attempting to normalise the stream of impulses by stimulation or inhibition, we are not directly modifying the vital processes, but making up for the lack, or excess of the environing stimuli necessary to the vital phenomena. In this sense inhibition or stimulation is, osteopathically, therapeutic, because corrective of the obstruction or of the interrupted environing stimuli necessary to normal functional responses or reactions of the different parts of the organism.

Inhibition, or stimulation, in such a case, becomes the means of rectifying the vital manifestation and thus permitting the full and free expression of the inherent vital forces through the structure in response to environment. The environment of the body, in other words, is really a part of its physical structure. It is in this sense that diet and hygiene, antiseptic and germicidal agents, if there are such, belong to the osteopathic system of therapeutics, because these form an essential part of the structure of the organism. It is in this sense also that the surgery of the removal of parts of the organism that have become dangerous to the organism life, is also osteopathic, because here there is the removal of a death stimulus which, if permitted to remain in close relation to the body, would destroy the organism life.

It is in this sense that we speak of not only bone and muscle and ligamentous lesions, but also of food lesions, hygienic lesions and surgical lesions, these in their turn representing the different factors of obstruction or of impediment to normal vital expression, the removal of these being necessary to normal vital manifestation. In all of these cases there is no appeal to the vital forces, to the vital processes, or to the origin of these, and there is no attempt made to alter the character of the vital forces or processes. We simply take hold of a lesion in the structure, activity or environment field and remove that lesion in order to allow perfect, or as nearly perfect expression as possible.

Every means used therapeutically may be classified under one of two heads:

First: Medicinally- some agent being used as a means of modifying the vital processes or the underlying vital forces.

Second: As a physical, mechanical or vital means of correcting or removing conditions that obstruct or interfere with the manifestation of the vital activity in the so-called field of vital processes. In the application of this principle anything from hot air to sunlight may be of value in altering the physical structure, or the environment; even vibration may be of service in the field of correction, provided it is used as a corrective means. Similarly, diet, changed habits of life and modified environment are also valuable in the corrective field. Practical application in these fields of the principle of adjustment represents the foundation on which these we build our school of practice as a system of healing.

I. The osteopathic principle, therefore, lying at the foundation of disease or unhealth, or both, is that of physical, toxic or vital interference, obstruction or maladjustment. The therapeutic principle here is that of correction, removal or adjustment, in order that the physical medium of vital manifestation, including environment, may be absolutely undisturbed. This includes structural relations and correlations within the organism. Here the corrective work, based on manipulation, is of the utmost importance, but we must remember that it is only as a means, not as representing the principle of the system.

II. Next to this in the field of Osteopathy comes the field of prevention in connection with

- (a) Diet
- (b) Hygiene
- (c) Bacteriology

All of these fields must be correctly understood and attended to in order that environing conditions of the structure may be absolutely free; otherwise obstructions to free vital action may prevent the life forces from keeping up the physical structure to its maximum of integrity.

In line with this, if there are germicides, these belong to osteopathic therapeutics as a means of removing such disturbances to normal adjustment, whether the germ is to be considered as a result of lowered vitality, or as a cause, through infection or contagion, of still further lowering the vitality so that self recuperation becomes impossible. Antidotes for active poisons, or for passive poisons that accumulate in the structure of the cells, or in the tissues of the body, or become collected in tumorous masses and organized around certain foci of degenerated tissue structures in the form of morbid growths, are also osteopathic, because these are the means of removing obstructions to physical expression. A cure of the condition without such removal is impossible. As long as these poisons are in the system the structural integrity of the nerve cells is incapable of forming a functional basis for normal action, because the present toxin acts as a continued irritant.

Hence, in the application of our principle this disturbing element must be removed from the life stream. In dealing with this disturbing factor toxicology must take account of two forms of intoxication, or poisoning:

(a) Active poisoning in which the chemical substance lies on the superficial plane of circulation, or on the surface of the nerve tissue, mucous membranes, or on the surface of the metabolic cycle, as the field of changes preparatory to tissue reconstruction. This is the field of nutrition and the problem is, shall the nutritive substance be pure or toxic?

(b) Passive intoxication or poisoning. When the poison has become a part of the dynamic force of the organism, the tissues or the cells, the poison itself being stored up in some dynamic form that keeps it continually in the fluid and nerve stream.

This dynamic poisoning seems to hold a continued check on the cells, or tissue structures, so that normal functioning, practically of the nervous system, is impossible. This is the cumulative action of the drug substance and represents the bioplasmic field of osteopathic therapeutics. The persistent use of patent medicines and the continued use of bromides, iodines, mercury, arsenic, quinine, etc. in the course of the medicinal treatment of diseases, brings out the necessity of getting cumulative poison action.

Some of the magazines, like Collier's Weekly, have called attention to the harmful results from the use of common remedies, like "Liquézome". We have been able to demonstrate by chemical and biological tests applied to the secretions and excretions and by use of substances extracted from these secretions and excretions in such animals as the dog, cat, rabbit and guinea pig, that such substances as arsenic, sulfonal, chloral, cocaine, morphine, toxins of the infectious diseases such as diphtheria, scarlet fever, measles, spotted fever and syphilis, remains in the system for many years, producing symptoms of a cumulative deposit of poison, or its dynamic equivalent and, when eliminated, giving the reaction of the original drug substance.

In tumorous conditions the accumulation of the autotoxins and the foreign poisons taken into the organism in medicine form, as well as the waste of metabolism, tissue degeneration and defective elimination can also be proved. It is not to be wondered that chronic neurotics, paralytics and imbeciles are found almost everywhere around us. These represent the wrecks of drug action, auto-intoxication and metabolic waste degeneration. The structure and the environment of the physical body in these cases become absolutely toxic or intoxicated and no cure is possible until this intoxication is removed. This is the only way in which the stream of life forces may become unobstructed, just as no one would attempt to treat a case of carbolic acid poisoning, gas poisoning or prussic acid poisoning other substances. Toxicological measures, both chemical and dynamic, must be adopted to rid the structure of the poisons that prevent it from being the normal medium of life forces.

III. The same principle applies to the so-called germ diseases. We have absolutely no evidence that germs are the first cause of disease. The self protective power of vital endurance in the cells and tissues is lowered, or lessened, before the germs can find a lodgment. When the vital force is lowered beyond the point of protection it is impossible to expect it to be capable of recuperation. If bacteriology under those circumstances can furnish sufficient germicides to kill the germs, or some of them, without killing the patient as they are thrown upon the surface of the circulation, then the recuperative vitality will be reserved for the upbuilding. We must remember, however, that behind every germ action lies

- (a) Lowered vitality
- (b) Lessened protective power
- (c) An incapacity of recuperation.

These all depend on intoxication in some form of toxemia.

If antiseptics are available to prevent sepsis, or the destruction of germs and the liberation of toxins takes place, then we have another osteopathic means in antiseptics to aid in the process of removing all hinderance to perfect structural adjustment. Even here, however, we must remember that the better method of dealing with the toxemia and the septicemia is to overcome the toxic and septic condition. In this sense pure blood is the best germicide and antiseptic.

Another question arises here, however,-- Are there not conditions in which the body is unable to respond to the blood forming function, so as to be able to present blood of a sufficient quantity and quality for these purposes? In such a case the life of the patient hangs on a balance and the system is unable to make sufficient blood to satisfy the conditions of germicidal and antiseptic action. In such cases an artificial germicide and an artificial antiseptic may be servicable to the organism in the preservation of its structure. It has been demonstrated that fresh air, exercise and sunlight in the so-called open air treatment of tuberculosis satisfy the conditions of germicidal and antiseptic action. In other words, no one can cure tuberculosis, or even check it, if the patient remains in a stuffy, stifled and badly ventilated atmosphere as the medium of physical life, or if the patient remains unresponsive by lack of physical exercise, or if proper diet is not furnished to force nutrition and metabolism along such lines as will compel the tissues to reconstruct their substance, free from waste, degenerated matter and poison. Hence,

IV. Diet and sanitation form two essential conditions in the field of osteopathic adjustment. Diet, hygiene and sanitation have been discussed largely, both by medical and non-medical writers. In a

an indifferent manner. The result is that in neither of these fields do we find the correct application of the principle of adjustment. In all of these fields, namely, diet, hygiene and sanitation, there is therapeutic action in so far as these can be made helpful in carrying out the corrective principle. If disease is caused by tissue derangement or maladjustment in the tissue itself, or its environment, or both, the principles of diet, hygiene and sanitation are the same as those of osteopathic manipulation, namely, adaptation to the particular body and to the conditions of the organism in that particular body.

V. All along the line of the history of Osteopathy the surgical idea has been prominent. Dr. Still himself declares "The Osteopath is a surgeon and his work is that of a surgeon in all diseases peculiar to the human family that he is called to relieve by his knowledge of normal anatomy. He knows the abnormal and by his adjustment he gives the relief sought and he gives it as a surgeon, understand the form and the function of the body and all of its organs."

Hand surgery, the original idea of a surgeon, enables him to adjust structures, to coapt separated articulating structures or surfaces and to unite parts severed by solution of tissue structure continuity. Operative surgery simply carries this idea one step farther; that is, it enables the surgeon to remove those parts that endanger the life or the integrity of the organism. Here the principle is the same as that applied in the more simple osteopathic case, namely, the removal of an impediment to vital expression. The tendency has been to make surgery a specialism or a cognate science, so-called, outside of Osteopathy. This, however, is incorrect. Surgery as a whole is an integral part of the osteopathic science. Its principle is not similar, but identical with the more simple osteopathic case.

In order to make the science of Osteopathy independent, and at the same time co-extensive with the field of healing, there must be a complete preparation in all of these fields mentioned, including the field of surgery. The great danger in modern specialism along the lines of surgery is that every condition of disease is looked on as a properly operative case. The great trouble in surgical diagnosis among the surgeons is that surgery aims simply at relieving a local condition, without reference to the organic whole of the body.

The osteopathic field of surgery is primarily the field of bloodless surgery. This is the field of the dislocations and the lesser displacements. From the osteopathic standpoint the disturbance is regarded as that of maladjustment, rather than of malposition, as it is looked on from the surgical point of view. Therefore, the difference between the osteopathic therapeutics in surgery, and surgical therapeutics proper is that in the former case we apply the principle of adjustment rather than the principle of corrected position of structure, which is the surgical principle. In the field of surgery itself, the so-called Lorenz operation will illustrate this point. According to Lorenz the dislocated hip must be reset. To accomplish this he takes soft tissues—tears, ruptures and separates them from their osseous attachments. For what purpose? In order that the bone structures may be placed in apposition so that, if necessary, a reformation, or a new formation, of an articulating facet may take place.

Osteopathy, on the other hand, teaches that structures must be adjusted on the basis of the mechanics of mobility, not by the mechanics of force, or on the principle of position. Therefore, the principle applied is that of physical adjustment, subject to the vital mobility of the soft tissues. To tear or break or rupture or loosen the attachments

of these soft tissues is to destroy vital mobility. Preparatory relaxation must pave the way for the adjustment of the articulating structures adjustment of the articulating structures. Much of the surgery of fractures dislocations and sprains found in the field of surgery proper violates this essential principle of Osteopathy. For example, many cases of stiffened joints and rigid articulations are found at the present day as the result of the improper application of the principle of immobility and the incorrect use of the splint, braces and plaster casts.

The problem in osteopathic surgery is, how can these conditions be changed? The answer is, by applying the osteopathic principle in opposition to the surgical principle, namely, that in all surgical work, immobility applied to a fracture is simply the means of carrying out the principle of mobility. Immobility is of value only to overcome the solution of continuity, excessive relaxation or rupture, or for the purpose of reestablishing normal articulatory conditions; but we must remember this, that immobility means the suspension, or the absence of life condition of mobility of tissue, circulation of fluids and the transmission of nerve impulses. Above all, it suspends, and if kept up for a length of time, it destroys the adjustment of the structures.

The osteopathic principle to be applied in all cases, without exception, is that of adjustment, and in case it is necessary to co-apt structures, relax or contract soft tissues, force the formation and development of an articulating facet, the object must be that all the separate parts be brought together in co-activity, without one part being separated or hindering the adjustment of the other part.

The medical surgical treatment of curvatures by means of braces, springs and supports, when compared with the osteopathic treatment by adjusting all the contiguous tissues and gradually restoring normal tonicity, articulation and support to the osseo-ligamentous and muscular structures, also illustrates this point. The same thing applies, as we have said before, to the replacement of displaced organs by the use of supports or tampons, to the surgical operation of ventral fixation, the use of abdominal braces or belts, and the cutting of tendon ligaments in the eyes, in the arms or in the limbs, muscle cutting in torticollis and cross-eyes, illustrate the old surgical idea of local palliation, which will require to be entirely removed from the field of osteopathic surgery.

Osteopathic surgery, then, deals with these from the standpoint of the disturbance causing

(a) Excessive relaxation or excessive contraction.

(b) Altered adjustment of the body from the spine, the result of which is the alteration in the central gravity line of the body and the change in the relation of the organs within the cavity of the body, so that the organs lose their pressure supports in the cavity in which they are located. In all of these cases the knife, the sound, the repositor, used in surgery, are entirely unosteopathic.

The osteopathic principle in surgery is to correct the inequality in the trunk as a whole, in the posture of the spine, in the relief of the maladjusted tissues, organs, or spinal vertebrae. If these things are done on the basis of adjustment, replacement will follow by the application of the principle of vital energy, without mechanics.

The same thing applied to the surgical treatment of tumors by operation, especially the malignant tumors. Osteopathic surgery points to two conditions in these cases:

(A) Mechanical disturbances either in the nutritive or eliminative sides, and (B) Toxic conditions within the fluids of the body as

the causes of the overgrowth or new growth of the tumors.

The lymph and venous blood are practically always obstructed in these cases. As soon as these are liberated by the correction of the maladjustment and the toxic conditions eliminated, the tumor becomes floating, if it was previously bound to some tissue structure, and then softening takes place preparatory to disintegration and elimination.

Operative surgery applied in these cases simply relieve a local growth by removing it, without taking account at all of the toxic conditions of the blood, the impaired or neurotic conditions of the nervous system and the structural or environmental lesion producing the diseases condition. The result is that the malignant tumors removed by surgery from one particular location will recur again, unless the primary cause of the original growth is also removed. Here osteopathic surgery comes in to establish several principles.

First: The removal of the toxic or mechanical cause.

Second: The building up of systemic resistance to a point at which, by the exercise of its secretory power, it will not only destroy the toxic substance by rendering recurrence impossible.

Third: The removal of the localized tumor only if it is endangering the life or health of the patient.

Fourth: The correction of the primary condition causing the growth and the prevention of the establishment of abnormal excretory condition by the reestablishment of normal secretory conditions.

In all of these points we have the application of the principle of osteopathic operative surgery, instead of surgery, in other words, representing an end in itself, that is, to remove the part affected. Surgery is simply an osteopathic means to an end; namely, a means of conserving the health, the force and the protective powers of the organism, the end to be aimed at is not a surgical operation, but the entire recuperation of the patient's organism.

Osteopathic surgery removes a dangerous part just as we remove an ordinary lesion, and for the same reason, because both stand in the way of the perfect adjustment that is necessary to health. The application of this principle to the entire field of practice does not mean that we adopt the principle, or principles, of any other system. It means that we apply the basic principle of Osteopathy to every field of practice. No other field or, or method or practice can help us if we fail in our own, because the application of the principle to every particular condition that may arise in connection with disease, means that everything has been done that can be done to help to restore to normal the organism of the patient.

The medical profession at the present day practically admit that this position is correct. In an editorial in the New York and Philadelphia Medical Journal, we find this statement: "The method of treatment of many diseases is undergoing a change which is more or less revolutionary. The era of polypharmacy with its multitude of drugs, the use of many of which is often in the highest degree empirical and unsatisfactory, is passing away." After reviewing the changes wrought by hydrotherapy, exercise, massage, Osteopathy and the physical forces, the editorial closes as follows: "To physical force or to animal extracts we must look, in all probability, for the cure of malignant diseases, which has thus far baffled all other means of treatment."

The Fort Wayne Medical Journal declares positively "In all the acute specific diseases, as pneumozia and typhoid, we have no drug which will shorten the processes and it seems worse than useless to continue the administration of remedies for other purposes than palliation and the pro-



motion of the patient's comfort."

This is the negative side of the admission of the medical profession. There is a positive side, however. In the New York & Philadelphia Medical Journal there is an article entitled "Some of the principles of manual therapy", By Dr. J. P. Arnold, of Philadelphia. Among the points that are brought out in this article, we summarize the following:

(1) He recognizes manual treatment as a therapeutic agent. The therapy as brought out particularly in its application to cases considered incurable by any drug system.

(2) The therapeutic value of drugs is empirical and uncertain. The effect of drugs used as medicines depends on their chemical reaction on living protoplasm, of the composition of which we know nothing.

(3) The value of the spine as an objective diagnostic field. All internal conditions manifesting themselves by signs brought out by the proper examination of the back.

(4) The mechanical aspect of the organism. Most always it emphasizes "Every living organism is a mechanism which expresses its activity in response to changes in the conditions that surround it. May we not say, systematically change the environment of the body that we may, in a measure, modify not only the normal conditions of the body, but also be able to govern pathological conditions. That we may is borne out by chemical, embryological and physical evidence." Here we have the principle of Osteopathy recognized both in the field of diagnosis and therapeutics/

Many writers in the Medical Journals are recognizing at the present day that Osteopathy has a distinctive principle (therapeutic), but these writers want to make this principle a part of their own system. In other words, they want to incorporate the Osteopathic theory and practice into the general practice of healing. One object in doing this is to deprive the osteopathic system of its standing as a professional system.

In an article in the Chicago Clinic Dr. Culbertson says that the least objectional form of Osteopathy in its recognition, is that it gives permission to the practitioners to practice Osteopathy as a "trade" without encroaching in any way on the the field of medical practice.

According to this attitude of the medical profession to Osteopathy, is the same as their attitude to hydrotherapy and massage. They are willing to admit that these are adjuncts of a system of healing, but unwilling to admit that there is an independent therapeutic principle involved.

Our best answer to those who try to make Osteopathy a "trade", that is, place it in a position of inferiority, is to maintain the independence of the system as such and to include within that field everything that is covered by the principle.

Professor Skoda, the Imperial Professor of Medicine in the University of Vienna, about sixty years, tested the treatment of thirty-one cases out of sixty-two, by letting them alone without using any means or agents whatever, the other thirty-one being treated in the traditional method. The result was, as stated by Skoda, that the larger percentage of the let alone patients recovered than those that were treated in the traditional method. This was the so-called medicinal nihilism which has extended since then to all the large hospitals, at least in Europe.

The investigations that have been conducted during these sixty years largely in the fields of pathology, including both the gross and the microscopic anatomy, have been aimed at the discovery in the microscopic field of bacteriological germs, both vegetable and animal. The net result, however, of the pathological investigations, particularly in the post-mortem field, has been to bring out the structural changes that take

place in the body as an organism and in the diseased organs of the body. Pathological anatomy has been made the foundation of the etiology of disease. On this basis whatever remains of the practice of medicine is represented by medicines that are prescribed according to the pathological method. This is the foundation of what is called in many of the larger colleges today, pathological prescribing.

The osteopathic pathology has carried this structural pathology a stage further. Instead of staining and embalming the dead cells and the tissue structures to find in these the causes of disease after the patients are dead, we find that the foundation of pathology is in the perversion of the normal function, as expressed there and in connection with adjusted or maladjusted structures. The perverted functional activity represents the starting point of pathological anatomy and in the foundation of the maladjusted structural relations. The reaction of the structure following this change is not, as the older physiologists claim, on the organ or tissue as such, but on the bioplasm. This carries us back of cell physiology and cell pathology to the original units which constitute the foundation of all tissue and organ life. Bioplasm, as such, is vitalized protoplasm. That is, it is the structureless substance that represents the primitive form of life. The bioplasm, then, manifests the vital phenomena and these vital phenomena are exhibited through certain structural characteristics in the organism, so that the organic life, as we know it, is the life of phenomena, originating from the bioplasmic centers.

This means the transmission of stimulation from the structureless substance to the structural or formed substance. The reactive expression of energy in the functions of the organism, the normal condition which is represented by the integrity of all the organic structures. Hence, we have both the structural and the structureless to take account of, and with corresponding characteristics in the field of pathology.

In the case of the structural substance we are dealing with the field of metabolism. In the structureless substance we are dealing with the field of the bioplasm. As the expression of reactive energy takes place through structure, so also the the repression or perversion of this energy must take place through the structure. The metabolic field, therefore, represents the field of energy and heat. The bioplasmic field is the field of dynamic energy and force, whether associated with the nervous system or any other part of the organism. Here we have the foundation of the new pathology based on the osteopathic principle. While the older pathology and its associated etiology depend on changes, both in the structural elements and structureless the modification of the structureless substance, the bioplasmic matters forming the substratum of organic life, the newer pathology and its associated etiology depends on changes, both in the structural elements and structureless elements.

First, Because these structural elements are the sole medium of vital expression.

Second, Every stimulus of whatever kind, whether normal or abnormal, depends on the integrity of the structural.

Third, Nutrition ultimately depends on the bioplasmic processes, the metabolic processes being simply a preparation for the bioplasmic.

The organism constantly stands on the defensive, the structural defending the structureless. All extrinsic agencies, physical, chemical or vital, that try to invade the living substance, being resisted at every point by the integrity of the structural or the semi-living substance. Up to the point of the integrity of the structural only can we have such a defensive action. This resistance on the part of the structural in the defensive of the structureless is self protective. In the attempt to protect the organism there are certain reactive phenomena that we call

the symptoms of disease. The symptoms represent a disturbance of equilibrium at some point in the structure expressing itself as an apparent functional derangement. Consequently, the integrity of the structureless cannot be invaded or destroyed by the toxic or the crude. The crude remains in the structural field, the force, representing the toxic or the crude, invades the structureless field. Hence, whenever an attempt is made, for any cause whatever, to disturb the normal, there is always a reaction or reactive manifestation of energy aimed at the expulsion of the toxin or the invader that is attempting to disturb the equilibrium between the structural and the structureless. This means that in the etiology of all diseases we must take into account four things:

- 1st: The condition external to the living protoplasm or the structural substance, changing the stimulation in the field of the vital processes.
- 2nd: The resisting power of the structural parts of the organism. That is, the structural defends the structureless.
- 3rd: The external condition succeeds in modifying the vital energy and if so, there is a resultant perversion of function that we call the beginning of disease. If, on the other hand, the structural integrity can be maintained and if the defensive powers of the structural are strong enough to ward off all extraneous influence, then disease is an impossibility; or, if there is an attempted perversion of function, then the perversion is aborted.
- 4th: The only way in which the structureless can be invaded is by forces representing toxic conditions which the structural parts cannot resist or destroy. Hence, the structural field is the field of lesions; the structureless field is the field of toxicity.

The therapeutic field, according to it is, of Osteopathy resolves itself into an attempt to aid an individual organism represented by the free constricted and formed organism, or ans, tissues and cells, all of these in a state of integrity so far as their structural parts are concerned to ward off disturbances in the equilibrium between the structural and structureless, and, if the disturbance has taken place, to expel or correct the disturbing element or elements. Perversion, then, is the starting point of all pathological processes. Perversion of function is not to be counteracted, therefore, by altering the vital processes, as is attempted by the medical practitioners, but by removing all the impediments to the perfect strength of the organism in its native structural capacity to combat all disturbing elements that enter in through the doorway of the structure.

In the bacteria, for example, we find a foreign organism on the metabolic plane attempting to gain an entrance into the living organism on the bioplasmic plane. Opposition is presented to such entrance,

First, By the environing conditions of the organism. Here we have mechanical and chemical forces that act the part of normal antiseptics and germicides. For example, the mucous membrane of the nose and throat continuously secretes a fluid. The submucous structures are abundantly supplied with phagocytes, and all the cilia that line the passages to the air cells exert a continued mechanical and expulsive action, tending to drive foreign bodies outward from the inner towards the outer air passages. The bronchial mucous lining secretes a very thick mucoid substance in which foreign bodies tend to become entangled, to be prepared for expectoration. Every portion of the lungs is freely mobile and with each respiration the lung is ventilated to its deepest recesses with oxygen that tends to carry the fresh air, and even the free ozone of the atmosphere, to the field of

infection, representing the most deadly foe of all germs. In addition to this the acid secretion of the mucous membrane of the stomach, the antiseptic and germicidal properties of the bile and the succous entericus act in opposition to germ progression. The motility in the peristaltic action in the alimentary tract unites with these in defense of the alimentary field. In other words, digestion, if normal, and secretion, if normal, have the power through their secretory fluids to destroy the most powerful toxins. This is evidenced by the fact that the average normal individual can take the rabies saliva and swallow it with absolute impunity.

The skin on the external surface of the body, like the mucous membrane on the internal surface, also acts on the defensive, the acids that we find in the sebaceous and sweat gland secretions being both antiseptic and germicidal. In addition to this the enviroing conditions of the organism make it almost impossible for germs to find a lodgement. The question is, when are those conditions changed? They are changed particularly when catarrh has so altered and hardened the mucous substances of the stomach and intestinal walls and lung tissue, so that motility is impossible, ciliary action impaired and the secretion function of the mucoid substance practically destroyed.

Second. If through some perverted functioning of the mucous membrane of the skin, there is a weakening of the tissue activity, the germs may succeed in gaining an entrance in to the vital substance field (bioplasm). In this field they are met by the internal defensive forces of the organism

(a) The action of the leucocytes in this field tends to bacterial destruction and to antidote or counteract the toxins. The germs, when they gain an entrance, act in one of two ways:

(1) Locally, by direct irritation. Here they cause a mechanical disturbance.

(2) By the production of certain products called antitoxins that are distributed by the blood and through the lymph streams. The leucocytes are capable of meeting both of these conditions, tending to destroy the germs that try to produce mechanical irritation in localized areas and counteracting toxic products of the germs by the production of an antitoxin. In this way the blood becomes the battle ground of a direct struggle between the living cells of the body and the living cells of the germs. At the same time the blood becomes the field of antidotal processes, which all tend to protect the tissues from invasion by germs and also to prevent their intoxication by the poisons.

In some cases, as in the nidus formation, accompanying localized tubercle development, a new blood system is organized in the minute capillary field surrounding the sight of the local struggle. The object of this new blood system is to aid in the supply of fresh blood, as well as to carry off the vitiated blood by a sewerage system.

(b) If the defensive conditions of the organism are reduced below par, then there are two possible results that may follow

(1) The germs multiply rapidly and at the same time produce quickly both toxins and antitoxins, so that the entire system becomes intoxicated, but also provided with a natural antidote. If the toxic condition predominates we have what is technically called toxemia.

(2) In the majority of cases a secondary complication arises the leucocytes, being unable to overcome the germs themselves, die in the struggle for existence and pass out into the circulation as pus corpuscles intoxicated with the poison absorbed from the germ excretions, inducing, as a result in certain parts of the organism, suppurative processes. That is, they develop, in addition to toxemia and antitoxemia, septic and

antiseptic conditions. These latter conditions result in tissue destruction, the tissues of the body sacrificing themselves to maintain the organic life, when the cells are unable to resist or destroy the germs. This is manifested in the emaciation of the body; abscesses that frequently cause blood poisoning. This is partially thrown off in some cases by expectoration; otherwise collecting in the system, producing febrile temperature, chills and sweats, gradually wasting the system and undermining its life forces.

This is the history of infection as we find it in the typical case. If such is the history of infection, then in the normal healthy individual such infection is impossible, because the resisting power of the organism is able to prevent such a possible infection of the tissues. In the majority of individuals this is not the case, because heredity, unnatural environment, improper food, unhealthy occupation, the worry and stress of the average life, accidents and strains that befall the body (especially the twisting of the spine) result in the weakening of the articulations of the framework and result in destroying the tonicity of the soft tissues. All of these conditions combine to make the body incapable of resisting the toxic and septic condition of disease.

(c) What can be done to meet these conditions? The most that can be done is to apply adjustive measures to the organism

(1) To elevate the standard of vital resistance to its maximum. Vital resistance here means the removal of all obstructing conditions in the physical structure field and in the environment of the organism, so that the vital forces may have entirely uninterrupted play.

(2) Do what we can to reduce to a minimum the possibilities

(A) Of the invasion of the organism by foreign bodies, either in the form of bacteria or their biochemical products, or in the form of chemical substances that directly poison and reduce the vitality of the tissues.

(B) Of auto-intoxication. Here the most important field is that of perverted digestive processes, or metabolism, which produce poisons that are freely absorbed into the tissues, and especially into the nervous tissues.

If this takes place the blood stream becomes poisoned and the vital processes are modified as a result of the self-intoxication. These represent the field of disease proper and also cover the ground that must be covered therapeutically by a system of therapeutics.

The problem, osteopathically, is Can we aid nature represented in the organism to correct these conditions?

1st: We can remove the cause or causes. This is the obstructive side of the physical conditions of the structure or environment of the organism. This makes the search for causes and the removal of these causes the fundamental principle of therapeutics.

2nd: After the removal of the cause, or causes, an effort must be made to adjust the vital functionings, so that normal conditions may be resumed as quickly as possible. Here signs and symptoms are valuable because they indicate the extent to which functioning is perverted by the primary causes of the disorder.

3rd: In the vast majority of cases it is not sufficient to correct a lesion, or lesions, because whether the lesions are primary or secondary, sequential results have followed from the primary or secondary lesions. These sequential results are reflex disturbances which affect a greater part of the organism. This is the reason why the functionings must be gradually adjusted to one another.

The adjustment in this case takes place:

- (a) Through the vital processes, or
- (b) Through the co-ordination of the nervous systems.

The quicker this adjustment takes place the better for the organism, because it will conserve vital energy.

In this line we must emphasize physical and physiological rest. For example, in all the nervous diseases in cases of perverted functioning of the alimentary tract from some original causes, in all the cardiac functioning derangements, and in many of the febrile diseases, rest in bed and rest from food, either by fasting for the physiological period, or by the use of predigested food, temporarily, to suspend all digestive action, are absolutely essential conditions to help the patient.

(c) Along the same lines we must apply graduated exercise of an active nature, always following the period of rest; or systematic exercises in such cases as paralysis and locomotor ataxia to restrain the muscles and to re-educate the central nervous system so as to make it exert normal control over activities. The object of these exercises is to establish a continual motility that will gradually overbear the evil effects of auto-intoxication and drive out the poisons of hetero-intoxication.

We must not forget that active exercise forces deeper breathing and this reanimates and replenishes the tissues with fresh life through freely oxygenated blood. The active exercise that is here called is not the active exercise of physical culture, but such exercise as is called for in the particular case tending to help the cure of the patient. The object is to prescribe as regulated exercise what will most nearly establish an adjustment of motion and locomotion in the particular patient along normal lines.

(d) The best means of gaining control over the vital activities, secondary to the correction of the primary cause, is through the vaso-motor nervous system. Vaso-motion, as we have seen, is the great co-ordinating function. Practically all functioning and functional activities are co-ordinated vaso-motion. That is, the vaso-motor system is the key to the circulation of the blood, the balance wheel in regulating the activities of the brain, the field of co-ordination between the pulmonic and systemic circulations, the only avenue that leads to the correction of alimentary disturbances, the normal regulator of the many secretory processes in the body, the means of correcting inequalities in circulation through the spinal centers, of determining muscular activities, the correction of nerve impulses and the distribution of stimuli.

Vaso-motor tonicity represents, therefore, the means of controlling the co-ordination of blood pressure and arterial tension and, as such, is the most powerful palliative treatment in Osteopathy. It represents also the greatest reconstructive force in the molecular field of anatomy, namely, in the nerve cell, and, therefore, is most valuable in the correction of the altered structure of the nerve cells, and in the modification of the many influences that constantly react upon the heart and brain, making these two organs practically the field of the struggle for existence in the closing periods of life. Consequently, in incurable cases where we can only palliate, the most important treatment that can be given is a vaso-motor treatment. That is, there are some cases that cannot be cured. The fact that they are incurable does not rule them out of the field of Osteopathic therapeutics. In other

words, the hypnotic and analgesic remedies that are used by the regular medical profession are represented in osteopathic therapeutics by the depressant action exerted through the vaso-motor field. The application, therefore, of the proper vaso-motor treatment is one of the most valued therapeutic measures at our command.

In a case of mitral regurgitation the vaso-motor treatment in the greater and lesser splanchnic areas (5th to 11th dorsal), treatment being given once a week, the aortic tension was entirely overcome, balancing the heart movement with the systemic circulation until the system, through the capillary circulation spontaneously rectified the inequality between the systemic and the heart circulations.

The articulation of the regional vaso-constrictor field (2nd dorsal to 2nd lumbar) both from the cerebro spinal and sympathetic sides, cured a case of chronic spinal meningitis that had failed to yield to any line of medicinal treatment.

Two treatments a week for six weeks in another case were sufficient to control an intercostal pain, so aggravated that for five weeks prior to the beginning of treatment the patient was kept constantly in bed of the flat of the back, making the spine so sensitive that it could not support its own weight without aggravated pain, locomotion in this case being impossible.

Vaso-motor treatment, without reference to specific lesions, entirely corrected a severe case of amaurosis (functional blindness) and acted in such a way as to remove at the same time the physical signs of a unilateral astigmatism; also overcoming the effects of atropine injected into the eyes by a medical oculist in the attempt to control muscular action and co-ordination in the eye field.

These are illustrations of the application of vaso-motor treatment as a palliative means of correcting functional disturbances.

In dealing with the malignant diseases, from the same point of view, we are able to demonstrate that these malignant diseases, including such diseases as cancer, leprosy, syphilis, tuberculosis and pneumonia are associated with a toxemia. Probably the origin is either a gastro- or entero-toxemia, absorption taking place of toxalbumins from the alimentary tract into the blood, resulting in the intoxication of the nervous system. This intoxication exposes the entire body to poison and to the poison development and accumulation, with the result that all poisons taken into the system, as well as those formed in the system, accumulate in the tissue fields.

The detoxinating glands normally are able to neutralize or assist these poisons and in doing so the glands form a non-toxic, but valuable, secretion that controls vaso-motion— the thyroids the dilator, and the adrenals the constrictor vaso-motor. Traumatism at a local point overactivity of an organ, the abuse of a function tend to form a weakened nutritive field, which becomes the center of accumulation, and also a degenerated growth. Saccharomycosis develops at this stage, the yeast fungi representing the waste or degenerated substance of fermentation. The result is, systemically, acid formation, explaining the presence of excessive quantities of gas in the malignant cases. The acid products of fermentation unite with the toxalbumins, and this combination becomes the nutrient substance of the cells of the body; the result is that nutrition over the entire system is vitiated, the cell structure degenerates and in certain localized points a malignant reconstruction and growth take place.

The cancerous cachexia, the typhoid and oneunomic skin, the jaundiced skin all bear testimony to this general intoxication. The emaciation that we find in cancer, tuberculosis and typhoid fever, are the

symptoms of degenerated nutrition. Dropsy, where it is present, represents the reaction of the system to the destruction of vaso-motor control. The main object of all treatment in the cases of malignant diseases, is to be directed to the establishment of vaso-motion.

This means that these malignant diseases are all blood diseases in two senses:

First, The involvement of the blood as a tissue and its depreciation as such,

Second, The control of the blood circulation is either impaired or lost.

Both of these are vaso-motor conditions. Anything, then, that will help to strengthen or regain the control of vaso-motion, anything that will help to destroy saccharomycosis, to antidote and eliminate the poisons, to counteract uric acid formation, to prevent or correct entero-toxemia will, at the same time, be helpful in leading backward to the correction of the vaso-motor conditions. In confirmation of this fact we find that the majority of patients who have, or have had, malignant diseases, die not of the malignant disease itself, but of some type of toxemia or septicemia, for example, toxemic peritonitis, toxemic or septic pneumonia, uric acid poisoning when the uric acid reaches the brain, and septicemia involving any organ of the body, are the common causes of death.

In dealing with these conditions, then, it is worse than useless to attempt to eliminate the localized toxemic product, because systemic intoxication is left behind. The palliation and cure of the malignant diseases lies, then, along vaso-motor lines entirely, plus whatever assistance can be rendered by elimination of the intoxication from the system.

#### THE POSITION OF OSTEOPATHY IN THE FIELD OF THERAPEUTICS.

If Osteopathy represents a new view of the science of therapeutics, then, as a system, it must take its place in the field of therapeutics. Here the question is, What position it should hold.

In the American Journal of Surgery and Gynecology for November, 1899, edited by Dr. Emory Lauphear, of St. Louis, he says in an editorial: "Just now an effort is being made by a number of Western states to oppose Osteopathy, to check its spread, to secure judicial and legislative condemnation of its practice. To all the misguided, too active opponents of this fad should be given the advice, 'don't' ". "The more it is talked against the more it will grow; the more it is opposed the more it will be advertised. The best way to kill it is to leave it alone. Osteopathy is based simply upon the principles of auto-suggestion; something is being done to relieve a specific thing and as a result of the all-powerful influence of the mind over body, a cure is often effected, especially in chronic cases. But the people will soon learn that Osteopathy does not cure typhoid fever, small pox, measles, diphtheria, etc., and learning this, they will promptly reject the whole practice if it be left alone. The system of Osteopathy will die of its own weakness. The way to annihilate it is to make rational application of its good principle and ignore the school as a whole."

In a special article by the same author on "Some practical points in the treatment of diseases of women," he says: "Osteopathy cures; Christian Science cures; even Weltmerism (the latest fad) cures certain cases. There is no use attempting to deny it; it is a fact. Under the influence of..."



Under the influence of each pain and ache grow less, health and strength returns; patients become happy and ascribe their good feeling to the special form of treatment they have received. The underlying factor of each system of treatment is one too long ignored by the regular profession, the principle upon which it is based, the extraordinary cures from the numerous shrines, relics, etc., and by faith healers, magnetizers et id omne genus. It is one which every gynecologist should know all about and apply in his work. It is auto-suggestion. This is the great principle, and should be the basis of practically all treatment in non-operative surgery gynecology."

It is difficult to discuss, criticize or comment upon this statement. The statement itself is so mixed up, consisting of fact and theory, that it is almost impossible to separate the truth from imagination.

One fact is admitted, Osteopathy cures. We do not care about the other systems that are mentioned, because we are not concerned with them. One point we wish to emphasize, Dr. Langhear has an entire misunderstanding of what Osteopathy is and how it acts. In this he is like very many others who do not know what the system represents. It is not a system of auto-suggestion, as he seems to think. Scientific suggestive therapy is undoubtedly a part of Osteopathy, as it is of every rational system. Such mental therapy is necessary in dealing with distinctly mental diseases. But Osteopathy recognizes body diseases as well as mental diseases, and it deals with these body diseases from a body or material standpoint. Osteopathic therapy is therefore material as well as psychic. Auto-suggestion has nothing to do with the therapy of body diseases because osteopathic treatment can be applied even where there is mental resistance. Osteopathic therapeutics is based on the fact, as has often been stated, that the body organism is a perfect vital mechanism; and that by careful adjustment of all of its parts on a normal, nutritive basis, perfect harmony may be established in the organism. This perfect harmony in the body mechanism means health, and the absence of this harmony means a diseased condition or an action or function that is distinctly abnormal.

Disease thus represents an abnormal action or function on the part of a portion or the whole of the organism. To correct this abnormal action or function is to remove the cause or causes of disease either from a structural or functional standpoint. This involves the fact that by manipulations the power of nature, vis medicatrix naturae, can restore perfect harmony and order to the system and to the organism. Osteopathic manipulations present a means, whether the patient is willing or unwilling, for the basis of the attempt to assist nature in perfectly restoring to health. This manipulation affects

(a) muscle or nerve, bone or ligament,, in fact any part of the body organism, as no part of the mechanism is removed from the nervous system or the vascular system or the lymphatic system to such an extent as to prevent operative manipulation affecting that part.

(b) This manipulation affects, in turn, the nutrition. Nutrition is based upon the perfect harmony of nerve force and blood supplied, in connection with the tissues of the body properly adjusted to each other, so that in dealing with the involuntary and automatic system, as well as in dealing with the voluntary system, Osteopathic treatment may accomplish results, namely, a cure.

We are glad to find the admission from such an authority as

Dr. Lanphear of the curative value of Osteopathy. Greater recognition will come with a fuller and better knowledge of the subject and a thorough acquaintance with what is implied in the system and its operations. Time, patient investigation and careful research on the part of the scientific Osteopath will certainly accomplish this result. Hence, scientific Osteopathy is based upon physiological principles, and as these physiological principles represent the undeniable principles of the body constitution and structure, a system that is based on these principles is bound to prevail.

The fact that every disease has not been cured by Osteopathy does not militate against it any more than against other systems. At the present time it is doubtful if the materia medica of any school has a single specific cure. There are many remedies and these remedies are undoubtedly helpful. But whether they are curative is a question that cannot be solved unless by a consideration of individual cases and of the bearing of the special kind of treatment upon those particular cases.

Osteopathic measure are, without doubt, helpful because they are restorative, in aiding nature to adjust the structure and to bring the functions into harmonious adaptation with one another within the organism.

Dr. Lanphear says: "The system of Osteopathy will die of its own weakness. The way to annihilate it is to make rational application of its good principle and ignore the school as a whole." Very well. How does this harmonize with his previous "Don't"? "Don't ignore it, otherwise it will prosper."

There is no danger of Osteopathy dying because it is founded upon undying principles, the very principles of the body constitution and organism. The danger is that Osteopathy may fall into the hands of the masseur or ignorant rubbers and pounders; but at this stage of Osteopathic history there is little danger of this, as there are enough scientific minds interested in it and pledged to its success, to dig out its underlying principles, to systematize these principles and to present it as a scientific system or school of medicine.

If Osteopathy is scientific and "rational", as Dr. Lanphear admits, its rational principles apply, and may be applied, to the entire realm of medical and surgical practice. And in the hands of progressive men this application of its rational principles will undoubtedly make it known as a system in every part of the globe.

Dr. Lanphear admits that the principle of Osteopathy should be "the basis of practically all treatment in non-operative gynecology." He does not know what the Osteopathic theory is, because, as we have seen, he confounds it with auto-suggestion. We take his statement and we apply it with unlimited confidence in saying, that the principles of Osteopathy should form the basis of all treatment in non-operative medical practice. In other words, we mean that the field of medicine is entirely covered, or will be entirely covered, when the physiological principles of this system are fully known and enunciated by Osteopathic and surgical practice.

It is ours in the meantime to find out these Osteopathic principles, to prove them beyond controversy to be scientific, and their application will undoubtedly revolutionize the whole field of medicine and surgery.

We are glad to find the admission made that Osteopathy is a system and a school. This is what we have been contending for all along, that it represents a scientific system of treatment. In the meantime we admit that it has not been able to apply its systematic principles to all diseases, mainly because of the lack of a clinical field. Its

first application undoubtedly was to chronic cases, because these were the cases that had proved to be incurable by other systems. Already, however, it has been demonstrated that in acute diseases, like diphtheria, typhoid fever and other diseases, Osteopathic treatment has been successful as a means of aborting and also relieving those conditions.

The work of Osteopathy in establishing its therapeutic value in the immediate future is a scientific work along two particular lines, First, in the clinical field, to find out and collect data representing the clinical experience in dealing with all the different types of diseases. The materia medica of other schools was built upon this foundation, viz. the use of certain remedies in certain cases of disease with so called beneficial results. On the basis of this clinical experience, as means of explaining it and demonstrating it in some cases, Secondly, the second field is that of physiological investigation, experiment and research to find out how the clinical experience can be harmonized with and based upon well established principles of physiology. This will undoubtedly be done in the immediate future and when it is done the system of Osteopathy will live, rather than die, in the strength of that physiological vigor imparted to the system by carefully, accurate and scientific research.

Osteopathy represents the latest addition to medical science, in fact, Osteopathy and Surgery represent the new school of medicine. We have the firm conviction that there is something new to present along the lines of medical and surgical science. The time is ripe for an attempt in the field of journalism to place this new truth on a scientific basis. Criticism and scepticism have attempted to drive from the field this new child of science, but without success. We note prejudiced judicial pronouncement from Judge Toney of Kentucky. This deserves notice because still widely circulated by medical authorities as their standard. He has charged on the allegation of the defendants, the State Board of Health, that none of the professors are capable of teaching any branch of science, or the principles of any branch of science, necessary for the education of medical students. It is further alleged that they do not teach any of the sciences or studies essential to the education of physicians or surgeons. This question is asked, "How can it be called a reputable medical college, when its own professors repudiate and refuse to teach materia medica and therapeutics, and chemistry, and anatomy and physiology, and confine themselves alone to manipulation?"

Claiming that this decision is based on a full and thorough enquiry into the facts uninfluenced by prejudice or hostility to Osteopathy and its teachers; it is a significant fact that although evidence was presented showing that chemistry, anatomy, physiology, symptomatology, histology, pathology, diagnosis and therapeutics were taught, the above statement was made as a direct misrepresentation. An unprejudiced consideration of the men challenged as incompetent, and of the roster of subjects challenged as deficient in the great scientific medical studies would lead to the acknowledgement that such a biased judgment is tyrannical and self contradictory. It is not our mission to defend men whose reputations are second to few, if any, in the medical schools of our country; nor is it our object to defend the parent school of Osteopathy judicially pronounced disreputable. These will be attended to in other ways. It is our purpose to rescue from the hands of men

ignorant of the science and of the first principles of cosmopolitan education. It is said. "the whole arcana of Osteopathy, in a nutshell, is manipulation- massage." When the writer was asked this question, whether Osteopathy is the science of manipulation, he stated positively that it was not. Osteopathy includes independent diagnosis, independent therapeutics, consisting of scientific- not as Judge Toney thinks magnetic or mesmeric- manipulations, independent stimulating or inhibitory movements, independent mechanical and operative surgery- all of these being necessary elements in the new science.

No law, either of God or man, no custom, either of antiquity or of modern times, has determined or decreed that drug medication shall be the sole method of dealing with diseases. To make such a claim would be unscientific, because an infallible judgment of fallible men. We of the newer school of medicine and surgery are going back to the principles and methods of nature, embodied in the oath of Hippocrates. "I will follow the system of regimen which, according to my ability and judgment, I consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give NO DEADLY MEDICINE to anyone if asked, nor suggest any such counsel."

Our faith in Osteopathy, and its scientific accuracy, is based on the fact, that Osteopathy is physiological. Despite the fact that the editor of the Medical Record of New York (Dr. Shrady), thinks Osteopathy is "a farrago of the greatest conceivable nonsense," we are not ashamed to admit our belief in it. If he and Dr. Matthews, the ex-president of the American Medical Association, had taken the trouble to look into the underlying facts of a physiological nature behind the theory and practice of Osteopathy, they would not have expressed any fear of dangerous results from its practice. Their prejudiced judgments are based upon absolute ignorance both of the theory and practice.

This is evident from the fact that they regard Osteopathy as massage, which is not the truth. At the same time they admit the efficacy even of massage, only denying its efficacy in organic ailments. The physiology of the human body sets forth the vital activity of the cell, the vitalizing force of the human-~~bed~~ nervous system and the vitalizing processes involved in vitalized material as the fundamental basis of body life. Physiology points out other methods of stimulating rhythm, peristalsis and the vital processes of the cells and fibers of the body tissue, than those of drug stimulation. "The biologic laboratory has become one of the important factors in the production of our remedies. In therapeutics we are content with nothing less than the study of nature's methods of curing disease in her laboratory, the animal organism." So says Dr. W. B. Hill in the American Medical Association Journal for January 6th, 1900. He goes on to point out "that natural resistance to disease is accomplished in two ways: (1) by leucocytosis, and (2) by the production of the specific antidote to the poison produced by the pathologic action of the microbe." This product is germicidal and also promotes leucocytosis in aiding nature against the bacteria; in this way the animal blood containing such chemical products stimulates the normal cell activity of the body, causing a tendency towards the normal. This is exactly the idea of scientific physiology and forms the basis of mechanical stimulation applied to the blood, the nervous tissue and the muscles in the production of these processes and products within the organism, to increase natural resistance.

Science is ever progressive, every new decade opening up depths and heights in the scientific field, hitherto unthought of. No science and art has been subject to so many changes as that of medicine,-- medicine in the widest sense. Dr. Malcolm Morris, F. R. C. S., in writing on the progress of medicine during the Victoria's reign, defines medicine as including "the whole art of healing and the laws upon which this practice is based." The science of medicine is not limited to drugs, their prescription and use. In fact, the therapy of the modern university medical college is rapidly discrediting drugs. The Encyclopaedic Dictionary defines medicine as "a science and art directed, first to the prevention of diseases, and secondly to their cure." Only a very small place in the educational programme is devoted to drugs. Anatomy, physiology, pathology, symptomatology, and diagnosis have found their guardians and promoters and defenders in these schools, and if we set aside pharmacology there is still left a large field of medical education.

We do not say that medicine is a generic term with Osteopathy as one of its subdivisions or branches. We do not place Osteopathy, medicine and surgery as co-ordinate branches. Osteopathy is not a branch of medicine or surgery. Dr. F. W. Hannah, at the Indianapolis Convention in 1900, said: "Osteopathy is a complete system of therapeutics, and as such, is both medicinal and surgical in its own peculiar way." (Minutes of convention, American Osteopath, Vol. 1, page 46.)

A profession has existed from time immemorial whose object has been, however, imperfectly fulfilled, to preserve health, and when unhealth existed, to attempt to restore health. The earliest traces that we have of medical services are of a surgical or manual character, long before INTERNAL medicine was thought of. INTERNAL medicine came in toward the close of the Greek philosophic period. Surgery at this early era included midwifery. The mechanico-surgical idea, however, prevailed, for among the teachers of Hippocrates, we find Herodicus, who treated even acute diseases by gymnastic exercises. Aesculapius was principally a surgeon. It was under the asclepiadae or guilds of lay itinerating healers that drugs became prominent as medicaments. Hippocrates laid down this principle, "diseases are cured by restoration of the disturbed harmony in being an action of the elements, elementary qualities, cardinal fluids and cardinal forces, nature, that is PHUSIS, the vital forces inherent in the body, accomplishes the cure."

The history of medicine of healing from those days till the present has been a history of methods, schools and systems. Among these methods or systems we find Osteopathy, the heir of all these mechanical and physiological principles applied from remote antiquity to the present day. Osteopathy did not invent a new anatomy or physiology or construct a new pathology. It has built upon the foundations of sciences already deeply seated in the philosophy of truth, chemistry, anatomy and physiology, a new etiology of diseases, a new systematic method of treating diseases, gathering together, adding to and reinforcing nature methods of treating disease that have been accumulating since the art of healing began to be practiced.

Osteopathy starts out with a new principle in therapeutics, namely: "The self-sufficiency of the organism, without the help of any extraneous substances." The relation of drugs to the field of the practice of medicine is well expressed by the University of Edinburgh School of Medicine, which dates its chair called "the practice of PHYSIC", from 1685, the oldest chair in the University, leaving the wider term MEDICINE to include all the fundamental sciences, with obstetrics, surgery and public health.

We take the position that in Osteopathy we have an **INDEPENDENT SYSTEM**, the primary object of which is to present an improved method of dealing with the **FIELD** of surgery, obstetrics and the treatment of diseases in general, from an independent mechanico-physiological standpoint. As such it has a principle of its own, and a perfect system of diagnosis and treatment which elaborates that principle.

Gradually people are realizing that there are means of curing diseases more scientific than by the use of mysterious and uncertain drug potencies. Almost instinctively people in every land seem to be turning in the same direction, towards a system in which the main principle is the adjustment of the mechanism to itself and the harmonizing of its organic functions. The body is an orderly mechanism perfectly adjusted to itself. Our main duty is to keep it perfectly adjusted. Pain is found where a contracted muscle presses on a sensory nerve, in fact on any nerve; loss of muscle function, or paralysis, if it presses on a motor nerve. The misplacement of a bone, ligament, or muscle, the obstruction of a blood vessel calls for the mechanical skill of an operator to replace the misplacement or remove the obstruction, that in freedom the system may play normally. Nerve inactivity, fluid congestion, or the collection of diseased or germ-laden fluids in the system, call for the mechanical liberation of the affected parts, and in this liberation lies the secret of health restoration and the removal of sickness and disease.

Scientific investigators all over the world are beginning to recognize that we must take account of the structure and functions of the body in applying our therapeutics on a basis of adaptability to conditions. Dr. Willock, F. R. C. S. (British Medical Journal, Nov. 4, 1899. Dr. Willock is Chief Surgeon of Croydon Hospital, England. His paper was read before the British Medical Association in 1899), in calling attention to new treatments for the chestn says, these methods of dealing with these diseases "have thrust drugs from the unique position that they held. They have emphasized the fact that something else, other than pharmaceutical products, has an important remedial action upon pathological conditions of the respiratory and circulatory systems. Of all the several systems upon whose uninterrupted functional activity the continuance of life depends, these two are those over which we have most mechanical control, and it is by mechanical means that we can obtain a considerable and important therapeutical effect in certain unhealthy states of the heart and lungs." In regard to the application of mechanical treatment, he adds, that in this way "the strain upon the impoverished tissue is diminished and its vitality prolonged. In addition, the effect of continued movements upon elastic and muscular tissues, provided undue effort is avoided, is to develop them."

Here we have the statement that mechanical movements and adjustment give us an increased functional activity and an increased nutrition. If we add to this the facts, that physiologically nerve stimulation may be promoted, blood and lymph circulation freed, and obstructions taken out of the way by mechanical means, so as to free the nerve force, the blood, the lymph, and the peristaltic movements of the tissue, we have the fundamental basis of Osteopathy.

#### DEBT TO MEDICAL RESEARCH.

We owe a debt of untold gratitude to predecessors who have tilled the fields of anatomy and physiology, both normal and morbid,

and made it possible for us to apply the principles of Osteopathy with precision and definiteness to the human system. The principle of Osteopathy is a time honored one, SIMILIA SIMILIBUS CURANTUR, in the sense that the only rational and scientific method of curing disease is based upon nature. Nature has won victories in other fields. In the field of education nature won a victory in discarding the old system of cramming and making education the stimulation of mental development by the skillful communication of knowledge by nature's method. Nature can do the same in the field of medicine. By removing everything that is unnatural, it can permit recourse to the perfect medicine laboratory of life, out of which the soothing draughts of nature flow to all diseased parts.

Allbut, in his system of the Practice of Medicine, makes this statement: "We give drugs for two purposes: (1) To restore health directly by removing the sum of the conditions which constitute disease. Here we act empirically with no definite knowledge-- often, indeed, with little idea of the action of our drugs. (2) To influence one or more of the several tissues and organs which are in an abnormal state, so as to restore them to or toward the normal. This purpose we effect by means of the influence which the chemical properties of the drugs exert on the structure and function of the several tissues and organs."

Drug therapeutics thus is empirical, lacking in exactness and scientific accuracy. Recognizing that medicine is applicable in a wider field, we attempt to go to the scientific basis of therapeutics, seeking to find why an organ or tissue is in an abnormal condition, using symptoms and morbid conditions only as a means to the discovery of causes, or at least using them as secondary causes. By a careful physical examination of the conditions of the nervous and vascular supply to the local parts, with the view of finding and removing any irritation or impingement in connection with these forces and fluids that supply the parts, a basis is laid for the correction of the condition by manipulation-- this is Osteopathy.

The theory of medicine or the healing art-- for I take these as synonymous-- is that from a physiological standpoint it is possible to employ scientific means to preserve and prolong life; and when life is attacked or threatened by disease, accident or malpractice, then certain physiological principles may be brought into operation in connection with the body system to cure or alleviate those conditions that threaten to destroy life or to interfere with and lessen health and happiness. I use "physiological" in the sense that physiology is the science of organized life; therefore structural and functional integrity are implied.

In all attempts-- ages, attempts have been made to apply measures to the human system with this end in view. Arising out of these attempts to preserve and prolong life and free it from disease, we have the medical profession which, from the most remote antiquity, has established its right to deal with disease, recognized its normal and legal responsibility in dealing with human life and health, and has attempted to make life more pleasurable and therefore more happy to the living and even to the dying. Custom, together with the formulated laws of different nations, has given legal sanction to this profession that aims to prevent disease, to prolong life, and to increase the comfort of life.

No empirical standard has ever been laid down with unerring sanction, as the accredited standard of measures to be adopted to secure these ends. From a remote past, magical measures and hypnotic in-

fluences in the hands of a priestly class of physidans played a most important part in this service.

With the discovery of the medicinal properties of plants, minerals, and certain extracts of animal tissues and organs, these were employed as medicinal agents, and blood-letting and blistering were resorted to in the attempt to counteract certain supposed influences at work in the body organism. Certain vibratory and massage movements were found to have a bearing on body metabolism and organic functioning, and these were adopted as remedial agents.

It was found by Hilton, Keith and others, that the principle of rest applied to the organism or its parts, otherwise in active operation or overworked, brought to this overactive organ or hyper-functional part of the organism a new and therapeutic principle, in permitting nature itself, under the influence of dietetic recuperation, to restore the harmony of all its parts, and therefore to restore health. (Every one should consult Hilton's Rest and Pain, and Keith's Pleas for a Simple Life, and Fads of an Old Physician, to find the evidences of these tendencies away from drugs.)

Others have found that heat and cold when applied to the body have an important influence in modifying circulatory and nerve conditions, so that these thermal agents may be actively used in restoring towards the normal. Light has been found to have a marked therapeutic effect on the animal organism—a light of low refrangibility affecting the chemical processes, and a light of high refrangibility producing mechanical changes in the organism modifying growth and tissue tension in relation to the organism movements. Thermotherapy and phototherapy have developed with remarkable strides. They represent the harnessing of nature's forces so as to use them for the Benefit of humanity in the healing art.

The latest attempt to apply the therapeutics of nature comes in connection with Osteopathy. It may be best described as a physiologico-physical attempt to restore harmony to nature, on the basis of the human organism as a perfect mechanism, without external medication. Men in other fields, especially since the time of Virchow, have been led by the study of biology and physiology to regard the cell as the vital unit, capable of nutrition and reproduction, and on these fundamental functional bases capable of cell renewal and of forming in connection with a mass of such living cells the organism as "a summation of living unities, every one of which manifests all the characteristics of life." Side by side with this we find that nerve force, representing the function of the master tissue of the body, contains within it the secret principle of trophic functional control exercised in every organism of living tissues, the minutest nerve tentacles, more especially in the sympathetic or involuntary nervous system, controlling the necessary vital processes essential to the life of the organism. In almost every laboratory in our European universities, we find men delving veleeping deep into these physiological and biological processes, with the object of finding out, if possible, the secret of life in the cell and in the organism, and to account, if possible, for all of those vital processes that take place in the renewal of the cell and organism life. The cell is the unit of life energy. Thus life energy consists of vitality native to the cell, preserved and permanently continued by transforming food and oxygen into nutritive substance, physical and physiological life energy.



The old science of medicine represented by drugs began to call long ago by the attacks of scepticism which always comes before truth. In Moliere's plays we find an inimitable picture of one who was by nature a semi-fool, turned by art into a physician. His mind, as Goethe puts it, "was well broken in and laced up in Spanish boots." After many strokes of the hammer on the iron, he got his diploma, his highest recommendation being that he followed blindly the opinions of his forefathers.

Today we live in the age of freedom. In 1566 the Faculty of Medicine in Paris started the movement, by a unanimous decree, passing this resolution, "that antimony is deleterious and to be counted among the poisons. Nor can it be amended by any other preparation so as to be taken without injury." In 1615, the same faculty unanimously interdicted drug vendors, and called on all judges to deal severely with those who prescribe, administer, or exhibit for sale the said medicines. Both of these acts were ratified by the French parliament and were in force for one hundred years.

It was reserved, however, for Osteopathy to treat the blood not only as the means of life, the thread that welds the diverse tissues of the body into one under the guidance and control of master nerve tissue, but to regard the blood and the nerve force as the medicine of nature. It was only yesterday that we began to look on the body as a great living mechanism. In order that its vital force may be unobstructed, the different parts of the machine must be adjusted to every motion of bone, ligament and muscle; pure air must penetrate every minute cell of an unimpeded lung and every minute recess of healthy tissue; pure blood must circulate in every organ and tissue, and a perfect nerve substance with an irrepressible organic force must animate every tissue and pass through every region of the body. To see that this is the condition of the body is the function of Osteopathy.

Osteopathy claims that to administer inorganic drugs internally is harmful to the system. In this it is supported by some of the most eminent physicians who represent the tendency of anti-drug therapy. The illustrious Hilton, of world reputation, the author of "Rest And Pain", advocated the now celebrated rest cure. Among others we find Dr. Keith, in his "Plea for a Simpler Life" and "Fads of an Old Physician", vigorously defending the same principle, and in a few of his scattered references anticipating osteopathic treatment, especially in connection with angina pectoris. The celebrated manual treatment of Ling has many features that are suggestive of osteopathic therapeutics. Dr. Wm. Osler, throughout his splendid work on the "Practice of Medicine", discountenances the use of drugs as unavailing and insufficient therapeutically, reaching the climax when, in speaking of the causes of diseases, he specifies "that most injurious of all habits, drug-taking," as one of the most constant causes of diseases. Sir Lauder Brunton, M. D., of St. Bartholomew's Hospital, London, makes this statement, in connection with headache, that is osteopathic in principle., when he says that there is "in migraine a dilatation of the proximal parts of the carotid artery with a contraction of the peripheral part, and that if I take off the strain from the vessels by pressing the carotid, the pain is at once relieved."

## The Continuity of

### Scientific Labors.

Osteopathy takes up the line of principles enunciated by such men as these, found scattered over the field of medicine, carrying to their logical conclusion the principles that underlie their work, namely, that mechanico-therapeutic measures, if systematically and physiologically applied, may form the basis of prevention and cure of diseases. Medical science is now passing from infancy to manhood, gathering up the copious generalizations of past history so as to subject them to the inductive examination necessary to their testing. Osteopathically we are attempting to reduce an art to science. This represents the modern spirit of scientific research, in virtue of which we hope to raise, out of the dead dogmatism of the past, the new science, in connection with clinical work in the hospital and scientific work in the laboratory.

Here we find the starting point of what we believe will certainly revolutionize the field of medicine. The field of Osteopathy is very wide, taking in the entire therapeutics of disease, both bodily and mental. It began by demonstrating its therapeutic value in the case of alleged incurable conditions. It has branched out in every direction until today it covers the whole field of medicine.

## Osteopathy's Relation

### to Medical History.

While Osteopathy repudiates drugs, it claims to be the heir of all that is scientific in the past history of medicine. Its principles have lain buried beneath the massive literature of all other systems of healing and have been used at times in the combat against disease; but the fundamental principles have never yet been fully systematized with a view to their application from a prophylactic and curative standpoint. While it is in the main dependent on scientific manipulations, it is not exclusively the science and art of manipulation. It takes in, and uses all the therapeutic principles that have been tested from the standpoint of nature, including the mechanical correction of misplaced tissues, bones, etc.; the use of proper hygienic and dietetic principles and, in fact, any principle that is in line with the natural laws of the human body.

The science of medicine in the wide sense, includes all methods of treating disease. The purpose of medicine has been to mitigate human suffering, to prolong life and to elaborate perfect knowledge of the organism. In performing this mission, schools and sects have arisen, flourished for a time and then ceased to exist. But out of the mass of decadent systems there arise facts handed down by tradition, preserved in written lore and in methods of healing that have enriched the science of medicine.

We sometimes speak of frauds in medicine, and characterize methods as visionary, but each system has represented some fact in principle that appealed to the human being and yielded a modicum of result. The old theory of disease was that of an entity which existed in the organism and possessed such a grip on the organism that to be cured the entity must be exorcised. In more recent times disease has been regarded as a condition, or state. Hence, the theory of disease

depended upon the knowledge of pathology, or the departure from normal physiology, and the knowledge of the action of agents to be used in dealing with the condition of disease. As drugs always operate in relation to protoplasm, the action of drugs must be studied in relation to the behavior of protoplasm under drug stimulation. Hence, this has been regarded for centuries as the sum and substance of therapeutics.

In the pre scientific age of medicine man instinctively followed the animals in their choice of remedies. During the dominance of mythology, mystic charms and fabulous superstitions controlled all healing arts. The scientific era of medicine developed in connection with the profession of embalming and the study of hygiene, through the embalmers, entered the knowledge of anatomy and, through the hygienists, the development of dietetic and preservation measures was perfected. With the development of philosophy, especially among the Indians, medicine was identified with astrology and the secret arts supposedly known only by the wise.

Medicine first became a science among the Greeks, who recorded their cases, visited patients in their homes, applied physical culture in the gymnasium and treated surgical cases by operation. Hippocrates, a skilled operator and keen observer, formulated a theory of disease according to natural laws, nature tending towards the normal.

Following Hippocrates we enter upon the era of the anatomists, Herophilus and Erasistratus writing extensively on the different parts of the body, with a theory of mechanics governing functionings.

During the Roman period, marked by Galen, we find the starting of physiology in connection with the spirits and humors, anatomy and physiology blending to give a theory of health and disease. In this field of medicine we note:

- (1) The Aesclepiadae, who formulated the atomic theory;
- (2) Thenison's theory of relaxation and contraction as the sole basis of therapeutics.

During the middle ages the Ambrins gained supremacy in the field of medicine, dividing with the Jews the honor of preserving the science intact during the dark ages. One of the most famous schools of medicine was the medical school at Salerno in Italy, honored by Emperor Frederick II as the center of medical education in the empire. The chief reputation of this school rested upon operative and fracture surgery. As this Italian school declined a Spanish school, given into prominence at Montpellier, elaborating Arabian medicine through the Latin tongue, paving the way for the Renaissance. Among the distinguished medics Gordon, a Scotchman, professor at Montpellier, wrote a practice, and Galdezen, physician to the English King, practiced the laying on of hands in the treatment of the King's Evil. Wendmo, the anatomist, probably the first to dissect human bodies and to publish an illustrated anatomy at Bologna, Galen and Celsus in Practice, and Hervey's discovery of the circulation of the blood, were the precursors of the new era.

It was during this age that schools of medicine originated, Paracelsus, in opposition to Hippocrates, founding the school of chemical medicine; during this period also physiology and pathology developed under the influence of the cell doctrines applied to both plant and animal life; during this period Harvey discovered the circulation; Malpigi the capillary system and Marchetti the union of capillary blending of arteries and veins.

Founded upon this knowledge of physiology the Iatro physical

school of medicine was developed by Borelli, of Naples, who explained the functions of the body on a purely mechanical basis. The bones were levers; digestion was a trituration process; secretion and nutrition depended on mechanical tension in the vessel walls and body heat was produced by friction between the corpuscles and the vessel walls.

Another school, the Iatro-Chemical, in opposition to the physical school, attempted to reduce medical practice to a purely chemical basis. This brought on conflict between two schools: (a) Sydenham attempted to reform medicine by substituting the conditions found in disease for theoretical ideas about disease. This was followed up by Boer Haave, in 1769, at Leyden, who tried to establish chemical methods of diagnosis; (b) Haller, 1811, established physiology as the foundation of medicine, differentiating between the irritability of muscle and the sensibility of nerve tissue; (c) Morgagni- his post-mortem investigations laid the foundation of morbid anatomy- 1820- 31. This gave foundation to the cellular pathology of physiology of 1848.

From these beginnings modern medicine, aided by researches and investigations in the different fields of physics, human nature, embryology, biology, etc. developed.

The mechanical principle of Borelli had lain dormant until modern mechanical systems revised its principles. The best known and most complete system is that invented by Peter Ling, and taught in the Central Institute at Stockholm, Sweden. The system of medical gymnastics included both active and passive movements. These movements have been well explained by Kellgren and Cyriax in their Manuals. The most comprehensive work is that of Cyriax, and it comes nearer to Osteopathy, because in it he recognizes the lesion.

It is a remarkable coincidence, that with the dawn of the nineteenth century the work of Cullen heralded a new common sense conception of medical science. Harvey's promulgation of the mechanics of the circulation gave rise to the mechanical conception of every function, and originated the "iatro-mechanical school." Under the chemical genius of Boyle the "iatro-chemical school" arose. At this stage the physical and mechanical principles were more clearly understood. Haller and Lavoisier applied the experimental method to physiology. Cullen, however, was stronger than any of these and although he died in 1790, the mechanical school which he represented lived on into the nineteenth century. The first impulse was given to it by Harvey. One of its staunchest defenders was Archibald Pitcairne, of Edinburgh and Leyden, who formed the link in the chain from Harvey to William Cullen and his student colleague, William Hunter. Boerhaave, of Leyden, and Hoffman, of Halle, contributed to Cullen's mechanical views. According to his physiology, (Physiology for the use of students in the University of Edinburgh, 1785) "the body is a hydraulic machine; its onward movements cause its heat; by its velocities the blood drives out humors and obstructions; the brain is the center of tonus, and a nervous fluid permeating the intricate structures carries energy with it; the body is made of a mixture of water and gluten, the proportions of which accounted for degrees of elasticity, flexibility, friability, etc. in health and disease; its connective and vascular parts by their pressures govern growth, activity, death; it observes rhythms, as do other moving masses, hence come critical days and periods, such as sleep and menstruation; in the fluctuations of nervous energy, spasm and atony arise, and are causes of many, originally perhaps of all diseases; fevers and inflammations are directly due to a flogging of parts of the brain or other

parts by the rebellious blood, which breaks out into guerrilla wars in this region or that."

Cullen's idea brought the body down to a basis of "solidism", introduced the movements of the body as an expression of the processes of the organism. Of course, he could not have the conception that we emphasize as at the basis of osteopathic work, that neither chemistry nor physics can explain all the body processes, for we must add the vital. Cullen emphasized one much needed lesson in the field of medical science, that mechanical movements are found in the body organism and that the mechanical principle cannot be overworked. But he represented another principle, that chemical relations must be recognized in the body, certain diseases being attributed to "acrimonies" (acids). Many of the diseases are explained on a mechanical basis, inflammations are local rebellions of the blood, rigor represents a rise of temperature in connection with the constriction of the superficial arteries. Mercury and bleeding are mischievous, balsams disorder the stomach and hinder nutrition, emmenagogues are to be avoided. For headache he recommends "low diet, cold bathing and avoidance of debauch and fatigue." Dr. Clifford Allbut has this to say of him: "Concerning drugs Cullen speaks with the same reticence and mistrust; many are the deceptions to which we are liable in estimating their effects; indeed he leaves few galenical reputations standing ----- \*\*\*\*\* And one great reform he promoted which is yet far from consummated-- he dethroned disease and set up the patient; He distrusted systems, and he saw that the only real is the individual."

Another point he emphasized was "the nervous force" as the life giving element. This nervous principle is not the soul, for the immaterial is united with the material through the nervous system so that thought is generated, and "thought", however generated, occasions new movements in the nervous system." It is this nervous principle which gives order and harmony to life in health, produces disturbance in disease, in connection with "spasm" and "atony", the two pathological conditions which represent the debilitating influences of an altered nerve force upon the organism. As soon as these debilitating influences changes arise, they awaken reaction and arouse the healing power of nature. Hence fear is a "reparative effort of nature", produced by lessened brain action with spasm of the peripheral blood vessels, which in turn stimulates the heart to increased action. By sympathy this develops atony of the alimentary system.

Here we have at the close of the eighteenth and the beginning of the nineteenth centuries, the germs of these ideas which at the close of the nineteenth and the beginning of the twentieth centuries are represented by the osteopathic principles, the mechanical, chemical and vital relations and reactions of the body organism.

#### P R E S E N T P O S I T I O N .

In the Journal of the American Medical Association for April 6th, 1901, there appears an article in the form of a statement from Jakob Bolin, representing the Massagers before the Public Health Committee of N. Y. Assembly. In connection with it editorial comment speaks of "honest Swedish Massage", compared with 'Missouri fraud, Osteopathy'. It is a pity because people cannot see eye to eye. they will descend to the low plane of vulgarity, in imputing dishonesty where no such dis-

honesty exists. The editor has only to look back into the history of medication to find that some of the most progressive of medicinal discoverers have been blackballed as frauds, impostors. He knows quite well that recourse is had to such a policy of sarcasm, and to say the least misnaming, when arguments cannot fail. And history has shown that time has thrown back into the teeth of such calumniators, the slender accusation. He goes on to say that whatever of value is in Osteopathy is massage, and then imputes ignorance and presumption in making manipulations, etc. As we have said we are sorry the editor displays both ignorance and assumption in making such statements. Let us be honest. Men differ in opinion. There is absolutely nothing fixed in medical history. No law either of God or man lays down a fixed and unchangeable method of diagnosis or method of treatment. The people see that the osteopathic methods succeed where the medicinal have failed. This does not make the osteopathic infallible, but demonstrates the fallibility of both. Mr. Bolin tries to point out the relations between massage and Osteopathy. undoubtedly "Manipulations and movements have been used in therapy from time immemorial", as he says. True the Ling system has been recognized by the government of Sweden as a reputable system. Massage is applied as an adjunct to medicinal and surgical treatment practically all over the world. That does not identify massage with Osteopathy. Despite the ingenious argument Mr. Bolin states, and this is true, "We (the masseur) takes the diagnosis of the physician. They (the Osteopaths) claim to make their own diagnosis." The he ridicules, as the general physician usually does, the idea of dislocation, luxation or subluxation.

The masseur is simply the serving of the old school methods, although in a great many cases they act independently, Mr. Bolin to the contrary notwithstanding. That is the foundation difference and we are glad it is admitted. The Osteopath does make an independent diagnosis. It is not always, as he seems to think, at least with the intelligent Osteopath, a case of dislocation. When calling in question the intelligence of the Osteopath, he does not fail to display his own ignorance. He cites a case which two eminent neurologists, with his approval, diagnoses as local cerebral venous stasis. The Osteopath discovered a subluxation in the neck. He could not have chosen a better case. The neurologists found a result, venous stasis, which the Osteopath did not deny. But the Osteopath recognized a cause in the form of a mechanical lesion involving pressure and obstruction, and thus producing the stasis. How any one with a scintilla of physical and mechanical knowledge could fail to see the relation of cause and effect, seems incredible. In Osteopathy it is not a question of dislocation exclusively; it is a question of obstruction, pressure, impingement, whether it be by bone, muscle or ligament. But there are conditions not due to displaced tissues, in which no physical lesions appear, and yet there is a functional involvement. As Dr. Tasker has said, subluxation, muscular contraction and the inhibition of nerve force are so independent that they cannot be separated from one another. The Osteopath admits all that the masseur, under the diagnostic direction of his medical master, finds, but he finds more.

Again Mr. Bolin says "it is proposed to give independent practice to persons who have taken a course of a month, or a correspondence course of a few months." Here we have what seems to us a wilful mis-

representation. Many do not seem capable of distinguishing between the true and false. There has been diploma mills in medical practice. There are undoubtedly in Osteopathy. But the purpose of legislation is to make it impossible. Osteopathy cannot be acquired in a month by anyone, be he medical or otherwise, in a correspondence course. There are studies that can be taken by correspondence when the student has a preliminary foundation education and sufficient of the student spirit to follow the guidance of the directing mind. In osteopathic, as in medical work, this is impossible; the minute differentiations of normal and abnormal anatomy and physiology, as well as pathology, symptomatology and etiology must be studied in practical cases, and demonstrated. Reputable Osteopaths know this, and the critical masseur and medical doctor also know it, if he has taken trouble to investigate the matter. Is it a part of medical policy to have it so? One medical journal, which is carrying the advertisement of two correspondence schools of Osteopathy, refused to give a regular school which has a regular attendance course, space in its pages. Another journal which circulates largely among the medical profession, and is frequently referred to with praise by the medical journals, made an agreement to advertise a regular school, but when the copy for advertisement was sent, failed to comply with the agreement, while it also carries advertisements of correspondence courses. Does the medical profession, then, choose to ally itself with the pseudo-side of Osteopathy in preference to those who wish to elevate the standard of education?

The N. Y. SUN of Jan. 21, 1902, wakes very wroth over Osteopathy. "The fact is that Osteopathy is only a rudimentary form of massage. The word means bone cure and the osteopathist tells his patient that a small bone in the head or spine is out and he will pummel it into place at \$100. per month. It is a passing fad. In twenty years it will be laughed at along with the imbecilities of the Perkins tractors. Let the Osteopath practice along with the masseur and the midwife and the nurse, but do not throw open the doors to the practice of the entire healing art." Evidently we have here the average newspaper intelligence upon scientific topics, not to say, falsification, for no one has ever seen a reputable Osteopath such as is pictured. In a previous part of the same article, the writer says that there is an open door for the Osteopath to pass the examinations and so acquire the right to practice. He says the regulars, homeopaths and eclectic do so. Yes, but they pass on their own system. Which must the Osteopath pass? Certainly not in all the others, and certainly, in justice and consistency, not in any of the three already existing systems, because he practices neither of them. Newspaperdom is generally consistent, but evidently the SUN has been gulled by a written up article from some medical man, or for the time it has lost its balance. Give the Osteopath the same right as the other practitioners, that is all we ask, but we ask as much and will not take less, the SUN to the contrary notwithstanding.

It is refreshing to turn from this garbled view of the subject to an article in Medicine, which gives certain credit and honor where they belong. "The founding of a special school of medical practice called Osteopathy directs attention anew to the value of manipulation in the treatment of certain diseased conditions. Some has described Osteopathy as a highly scientific massage; but an ordinary rubbing, kneading and tapping prescribed in the works on massage and practiced by masseurs are very different things from the manipulations of Osteopaths.

The latter are based upon the anatomical structures to be treated; sufficient force is employed to affect the deeper tissues. In improving the circulation, relieving pain, and absorbing inflammatory exudates by manipulation the average Osteopath is capable of teaching the profession valuable lessons." Here we have an important statement,

- (1) The difference between Osteopathy and massage, and
- (2) The recognition of the therapeutic value of Osteopathy.

The writer goes on to say, that, "the foundation of a school of medicine upon such a narrow therapeutic resource will ultimately bring the whole movement into discredit." Granted that it is therapeutic, who is going to limit its uses and application? Not certainly those who are not fully familiar with its theory and practice. That the writer is not familiar with this subject is evident, because he writes, "had Osteopathy limited itself to a legitimate application of its methods, and not attempted such absurdities as the reduction of typhoid fever by pressing upon the seventh cervical vertebra, it would probably have left a valuable impression upon the practice of medicine." It is the first time we have heard of Osteopathy curing typhoid fever by such a procedure. He must have been deceived by some fakir. We are glad, however, that the writer appreciates the difference between the bath attendant massage and the "manipulations based upon a careful appreciation of the anatomic elements in the structures which are treated, and knowledge of the muscular and lymph channels." If the writer became a little more familiar with the nervous system, and its relation to the different parts of the anatomic mechanism, he might be able to appreciate the full significance of the osteopathic system.

It is well to feel grateful for the admission made that the osteopathic methods represent therapeutic resources. If the writer knew the course of education in the osteopathic colleges, he would know that the Osteopath gets all the training (and more) of the medical man in anatomy, physiology, histology, pathology, physical diagnosis and additional training in anatomical clinique, the physiology of the nervous system and kindred topics. The Osteopath is taught as carefully as the regulars the hygienic dangers of infectious diseases, the gravity of manipulating tubercular joints, and many other matters which the average physician does not appreciate. In view of all this, and much more that might be added, we believe the time has come when the therapeutic resource of Osteopathy should receive adequate recognition and receive its proper place side by side with the other systems of healing.

The ignorance of Osteopathy on the part of its critics is wonderful. In the W. W. Lancet we find the following: "What is the kernel of therapeutic truth in Osteopathy? Simply that the more or less judicious movements of diseased parts cures such parts. This fact is demonstrated by the position of the Ling system in Swedish medicine, by the cures wrought among us by the imported masseurs and their imitative rubbers, and by the great popularity of Osteopathy among the laity. What is the harm of it? The harm of it is its indiscriminate application as a cure-all-- a system of cure--by its enthusiastic, but poorly educated leaders. What is the profession doing to reclaim this lost territory to its own? With us the little done is left to the untrained or the imported. Nothing is done to popularize the method, and this remedy of undoubted therapeutic value is wholly neglected in our smaller communities. The time is ripe for a well-



officers and well-equipped school of massage and physical culture."

We are glad that recognition is made of the therapeutic value of the method-- although the insinuation seems to be made that it is a system of cure-- that is, it is not. To identify Osteopathy and massage, as we have shown before, displays ignorance. Osteopathy is no more like massage than massage is like medicine. We accept the ignorant and blatant statement that the osteopathic leaders are "poorly educated." Pray what is your standard of education? Is it ability to converse or read in the dead or living languages? or is it acquaintance with the human body, its structure, organization, functional equipment, etc.? In any of these points we are not afraid of comparison with the leaders of the regular profession.

The writer seems to think that the profession should reclaim lost territory. As long as they do so by officering massage and physical culture schools we don't object. Osteopathy cannot suffer from this, because its system cannot be stolen by the ignoramus, nor re-duplicated by the movement fiend, even though he is a well educated medical leader. We respect the Ling system and honor the masseur, because they represent rational treatment; but osteopathic philosophy was dug from a deeper stratum of human nature than either, and it has far reaching principles of which massage and movements were simply the shadows. The writer seems to think that movement is the all in all of Osteopathy. Perhaps it may be a revelation, if we state that there are cases in osteopathic practice when movement is contra-indicated. In tuberculosis we have such a case, where movement is forbidden and absolute rest is the principle. It is true that mobility is the principle of vitality, and to this extent the osteopathic principle is founded upon the life force of movement (mobility). Beyond this movement is not the cure all. We are pleased to have confirmation of this in the Literary Notes of the Kneipp Water Cure for October. In a friendly review, which we very much appreciate and for which we extend thanks to the Magazine, it is said, "The science of Osteopathy is unfortunately far too little appreciated as yet. Most people seem to imagine that an Osteopath is only a superior kind of masseur. Well, we would only request all those people who have no better knowledge to read attentively this article and they will then be able to appreciate Osteopathy to its full and complete extent."

In the current events of Nature Cure for March, 1902, the editor congratulated the public of New York on escaping legislative monopolistic osteopathy. In so far as this represents an attempt to get special legislation, we are quite in harmony with the editor. We do not believe in any such legislative monopolies. We wish to dissent, however, from the state that "this system is superficial and avaricious. These manipulations are largely borrowed from massage treatment. \* \* \* The various processes of osteopathy are so few that any intelligent person can make himself proficient by a few weeks study from books; no other instruction is necessary, etc." We wrote the editor and received from him the assurance that he did not mean anything detrimental to Osteopathy. There may be capricious, avaricious, selfish and superficial osteopaths. But that does not cover the system. Osteopathy is much deeper than the editor thinks. It has a fundamental philosophy which years of study have not enabled some of us to fathom or evolve. Far from being able to master it in a few weeks, we have tried to con-

deny the philosophy and practice and have yet been unable to give it in its entirety in ten months of steady instruction. We join with NATURE in opposition to monopolistic systems based upon antinatural theories, but we maintain the dignity of the nature system of therapy. Osteopathy's *Materia Medica* consists of everything derived from nature, rejecting everything that is foreign to the body, basing its therapeutics upon the harmony of mind and body, the normal processes of vibration or rhythm within the cells, the swaying and nutritive value of the blood, the controlling action of the nerve force and the orderly arrangement of all tissue substances in the organism to form the medium of functional integrity. This is nature.

Mechanico-Therapy is becoming fashionable. The therapeutics of physical agencies by Dr. F. D. Henri Gumbail, 568 pages, shows the inefficacy of drugs as therapeutics agents. Most of the work is devoted to elaborate details of electrical treatment, but he has some interesting ideas on the functional activity of the nervous system in health and disease.

Another work on mechanico-therapy by Dr. L. R. Regnier, Radiographer to the Charite Hospital, Paris, gives an account of the active and passive exercises used in the treatment of deformities and other diseases. He claims value for mechanico-therapy in diseases of the bones, muscles, nerves, heart, circulatory system, lungs, etc. These two works are in French.

There is an interesting book in Italian, published recently at Milan, Manual of Massage, by Dr. R. Magnoni. He lays considerable emphasis upon vibratory massage as a method of treating osseous diseases involving the nasal mucous membrane. There is a splendid Bibliography at the end of the work.

A small English work, Lessons in Massage, by Margaret D. Palmer, 234 pp., gives a good fundamental discussion of the anatomical and physiological foundation of the application of massage.

Handbook of Physical Therapy is the title of a work by Dr. A. Goldscheider and Dr. Paul Jacob, of Berlin. This is the first part of the work published in German at Leipzig, 535 pages octavo, with 175 cuts, full of information on all aspects of massage, medical gymnastics, phototherapy, etc. This is an evidence of the growing recognition of so-called irregular and unrecognized methods of treatment.

It is remarkable how one system denounces another, even if both are reform systems. In the December, 1902, issue of Naturopath there is an editorial entitled the "Osteopath preposterous". Osteopathy originated in the conception of Dr. Still that the adjustment lay at the foundation of the body vital mechanism. His original conception of the blood as the vital foundation of health and his idea of arterial sway as the fundamental principle of life as well as of health, made Osteopathy vastly superior to the old time principles of the bone-setter. Dr. Still justly says he is the founder, his followers are the builders. If the formulator and founder of a system is the index immutable of the system the Naturopath had better get back to the primary water cure idea from which it took birth.

Nobody has claimed that air, sunlight and water originated in the twentieth century. Adam and the garden of Eden may well claim a copyright on nature, but let our would be critic remember that we live in a world of advancement. We do not live in the garden of Eden now,

with the garments made of leaves, perpetual sun and water baths along the banks of the Tigris or Euphrates. We live in an age when those who are true to father Adam adjust their bodies to a perfect mechanical order, adjust body to mind, and body to every environment— sun, air, light, water, etc. included. The record of osteopathic practice in ten years will favorably compare with the so-called naturopathic system.

We have demonstrated to the satisfaction of the people the major importance of our system and that its significance is far ahead of the lost or paralyzed hands of our critic. If the "readjustment of skeletal malformation, or malposition, and the stimulation of certain nerve centers" were honest, if the osteopathic principle of readjustment of the maladjusted, perfect adjustment of the body and its parts, of body to mind, of body and mind to environment were lacking, water, sunlight, exercise, mental healing would be in a sorry plight in its attempt to resurrect a lost humankind.

Naturopathy should give up the attempt to blacklist a nature system like Osteopathy, practice her own hydropathy as practiced in Germany, and add, if she pleases, heliopathy, psychotherapy, etc., without meddling or interfering in the osteopathic development of a life principle which is as old as man. We gladly welcome every nature system into the anti-drug phalanx. We are fighting for principle— an unadulterated mankind and womankind— the divine gift of life to our race; and having thrown down the gauntlet in our platform of principles, we have hoisted the flag and no rude or uncouth hand shall ever tear it down.

Our therapeutics aims (1) To remove all causes and conditions of unhealth, so as to restore adjustment, construction and adaptation, check, balance and stimulate the tissue and organ activities in order to throw off morbid products and conditions and clear all the pathways of vital activity to prepare for perfect functioning and perfect reconstruction of tissues and organs. (2) Supplying the necessary fixate principles to sustain life. Every proximate principle including air, water, sunlight, etc., is our servant in the fulfilment of this mission.

Osteopathy is co-extensive with the field of healing. In a closely reasoned article from the pen of Dr. E. R. Booth, President of the A. O. A., 1901-2, a clear and explicit statement is made of the relation of Osteopathy to the other schools of medicine and the law. It presents the idea we are contending for. The gist of the article is that, "the conclusion is inevitable, that we are, properly speaking, medical practitioners and that we hold a co-ordinate rank with other school of medicine. We have not simply departed from the practice most in vogue, but have adopted methods more nearly in accord with nature, and more in harmony with scientific medicine in all ages."

The Journal of the American Medical Association, Feb. 1, 1902, says, in an editorial, "A regular physicians belong to no school of medicine. They are not allopaths and are thus easily "differentiated from those who hold certain tenets." "The teachings in the regular medical school include no a priori generalizations about the causes of disease or actions of remedies. Teaching and practice are based, not on preconceived or hereditary ideas, but on the logical principle of induction, first the gathering of facts enough to probably eliminate errors, and then the drawing of conclusions from these facts. The method has been the same for all great investigators of nature, Bacon

being its first opponent." We fail to see the logic of the situation. Allopaths have not a monopoly of facts. Induction is all right, but if facts simply rest on a probability, such a probability can never evolve by logical methods a universal principle, such as must be evolved if allopathy represents "modern scientific medicine". Newton was one of the first great scientists of nature, from the particular in well authenticated cases, he reasoned to the laws of nature. Other schools of medicine have experimental facts and on these they base what are called "tenets". It is a satisfactory piece of information to gather that regulars have no "tenets". Truth is truth, however long it may have lain buried in the ashes of the ages. The great truth-facts of anatomy and physiology are not probable truths, but certainties, and those principles that are based upon these truth-facts are scientific principles. An accidental falling apple evolved the great law of nature in gravitation; may not the same accidental experience unfold great laws in the nature of man?

In the same issue of the Journal of the American Medical Assn., Osteopathy is dubbed massage. With witty sarcasm it talks of a bill to make adult citizens legislators. It forgets they are legislators without such a bill and that these same legislators, the people, are demanding recognition of the osteopathic system. In discussing the osteopathic bill, it says, "its presentation is an insult and its passage would be a wrong to everyone who has duly qualified himself by study and proven his competency under the existing laws."

Read what a member of the medical profession has to say, Alexander M. Ross, M. D., member of the College of Physicians and Surgeons, Quebec: "The spirit of progress in the arts, sciences and industries of the world during the past fifty years has wrought no marked change in the healing art. It is today what it always has been, a colossal system of deception, in obedience to which mines have been emptied of their cankering minerals, the intestines of animals taxed for their filth, the poison bags of reptiles drained of their venom \*\*\*\*\* all these and many other abominations have been thrust down the throats of credulous and long suffering human beings who, from some fault of diet, organization of vital stimulation have invited disease."

Is a new system needed? "Twenty-three centuries of medical treatment have passed, freighted with the lives of unnumbered millions. Not only the people, but the profession itself, has lost confidence in their ability, not only to arrest disease and relieve suffering, but were forced to admit that the mortality increased in proportion to the persistency with which the medication was pursued." So writes Dr. Rolla L. Thomas in the 1889 ANNUAL of Eclectic Medicine.

There is a demand for a reformed therapy. Dr. Louis F. Bishop, Secretary of the New York Academy of Medicine, in the Journal of the American Medical Association for Nov. 24, 1900, pleads for greater simplicity in therapy. "In the world of science, the greatest steps have always been towards simplicity \* \* \* so, while the accumulation of knowledge is constantly going forward, we find science, which is an application of mind to matter, always simplifying. In scientific therapeutics the same process is seen. The accumulation of observations has been great. They must be simplified and brought under straightforward laws and applications. The first step must be the

selection of a few drugs that represent the activities of their class. \* \* \* The plea for greater simplicity in therapeutics is directed particularly to those men who have reached what might be called the conditional stage of knowledge and whose medical experience has crowded upon them with such a flood of therapeutic suggestion that they are smothered by a sea of vague promises. \* \* \* There is the spirit of the gambler in him who would try an experiment with some complicated or secret remedy, because it is backed by the certificate of inaccurate observers, implying that the case in hand is exactly like one that was cured by this wonderful combination. \* \* \* More definite and simple therapeutics are an advantage to science in that the scientific method of inductive reasoning can be applied. \* \* \* It is utterly impossible to meet by popular argument, based upon therapeutics in the present complicated state, such simple propositions as that all disease is imaginary, or that all disease is to be cured by the restoration of a dislocated ligament. The apostle of any faith, who has a simple, definite proposition has often more advantage with the masses from its simplicity than disadvantage from its falsity."

The chaotic confusion and the complexity of mysterious combinations have certainly opened the way for simple scientific diagnosis and therapy. And it will redound greatly to the credit of science, as well as to the ease of the student and the practitioner, if such simplicity can be attained in diagnosis and therapy. Base it upon the body order and the harmony of function and structure and you will find no confusing complexity. Trousseau has said, "the practice of medicine is the art of curing, and it is nothing more than that; to cure is its object and all our plans must culminate in medico-surgical therapeutics."

We are not surprised that men like Dr. J. Tracy Melvin should take a pessimistic view of present therapeutics, and look to "present tendency of the profession to sweep away the vast mass of accumulated trash from the pharmacopoeia," truly as "a great stride toward scientific therapeutics which marks the doom of the old time drug shop." Do we wonder that physicians are impelled to have recourse to dabbling in massage-osteopathy as a means of holding their patients?

What is the place, then, of Osteopathy in the field of therapeutics? It is essential that we know this to teach and know aright its theory.

Chief Justice Norval, of the Supreme Court of Nebraska, in giving the opinion of the court deciding the test case that has been in the court for more than a year, in regard to Osteopathy, said, "The writer is not deeply versed in the theory of the healing art, but he apprehends that all physicians have the same object in view, namely, the restoring of the patient to sound bodily or mental condition, and whether they profess to attack the malady at its cause, they are 'treating' the ailment, as the word is popularly understood. We can, therefore, see no good reason why the practice of Osteopathy does not fall within the provisions of the statutes under which defendant was prosecuted, as clearly so as do ordinary practitioners". This means that the practice of Osteopathy is the practice of medicine.

A good many do not coincide with us in the view that the practice of medicine and surgery covers the entire healing art. We do not

take the view that has been attributed to us that medicine is a generic term, with Osteopathy as one of its subdivisions. In other words, we do not place Osteopathy, medicine and surgery as co-ordinate branches or subdivisions of the art and science of healing. Osteopathy is not a branch of medicine, nor co-ordinate with it.

A profession has existed from time immemorial whose object has been, however imperfectly fulfilled, to preserve health, and when a condition of unhealth exists to attempt to restore health. The earliest traces that we have of medical services are of a surgical nature, long before internal medicine was thought of. Surgery at this early era included midwifery. Internal medication came in towards the close of the Greek philosophic period. The mechanic-surgical idea prevailed, for among the teachers of Hippocrates, we find Herodicus, who treated even acute diseases by gymnastic exercises. Aesculapius was principally a surgeon. It was under the Asclepiadae, or guilds of lay itinerating physicians, that drugs became prominent as medicaments. Hippocrates laid it down that "diseases are cured by restoration of the disturbed harmony in being and action of the elements, elementary qualities, cardinal fluids and cardinal forces. Nature, that is, physis, the vital forces inherent in the body, accomplishes the cure." Aesclepiades, one of the most celebrated of the healers, practiced medicine, although he "discarded the use of medicines" and depended upon diet, hygiene, baths, exercise, music and frictional massage.

The history of medicine from those days has been a history of METHODS and schools and systems, even blood letting being regarded as medicinal. Many physicians deplored the splitting up of medicine into subordinate branches. Frerichs, in the "Zeitschrift für klinische medicine", 1818, said, "it seems here and there to be forgotten that medicine is the alma mater, that from it all the subordinate branches derived their origin. Medicine is not a part of the science of healing, it is the very heart of that science." Here the word medicine is used, not in the sense of drugs, but in the broadest sense.

According to the "Encyclopaedia Britannica", "the science of medicine is the theory of diseases and of remedies. \* \* \* Taking disease to be a deflection from the line of health, the first requisite of medicine is an extensive and intimate acquaintance with the norm of the body. \* \* \* The structure and functions of the body for the subject of anatomy and physiology. \* The theory of disease rests, therefore, upon the physiology with its more or less technical adjuncts. Pathology is all that physiology is, with the engrossing and difficult element of perturbation, deflection or shortcoming added." The second department of the science of medicine is the theory of remedies. Here according to the old schools, pharmacology, toxicology, dietetics, climatology, hydrotherapy come in as the basis of therapeutics. As, however, we have pointed out, friction, massage, movement from a remote antiquity have been included in the remedial field. The Ling system of active and passive movements represents "manual treatment as applicable to surgery and medicine."

Osteopathy did not invent a new anatomy or physiology or construct a new pathology; but built up on foundations already laid deep in the fundamental sciences of chemistry, anatomy and physiology, a new etiology of diseases, covering the first part of the science of

of medicine, "the theory of diseases"; and a new systematic method of treating diseases, gathering together, adding to and reinforcing nature methods of treating disease, that have been accumulating since the beginning of the medical art, thus covering the second part of the science of medicine, "the theory of remedies." Osteopathy does not deny or repudiate toxicology. It alters the therapeutic principle. Eclecticism, and especially phusio-medicalism, had done this before, the latter repudiating all poisonous drugs. Osteopathy does not find any use for drugs, except in the department of toxicological medicines; but it uses foods, unguents, water, climatology, antiseptics and ascertics in the field of hygiene, ~~preventitatt~~ preventive sanitation measures, etc. It admits the necessity of surgery, surgical dressings, lotions, anaesthetics. It follows the medical profession into the subdivision of specialism, including obstetrics, gynecology, ophthalmology, otology, psychology and medical jurisprudence of forensic medicine.

But how does the law bear on this? Some have contended that all medical legislation has been designed to bear upon the use of drugs. In England this is not the case. (a) The Apothecaries' Act of 1815 regulates the drug prescribing and compounding side of the medical profession. (b) The Medical Act of 1858 provides for the regulation of Colleges, and gives to the College under Government supervision the right to educate and graduate physicians and surgeons. The original regulation is a matter of common law and the common law of the United States represents the common law of England. According to the common law of England bearing on the practice of medicine, the profession is regarded as two-fold,-- that of the physician representing medicinal treatment, and the surgeon surgical treatment.

The later medical acts provide for the medical and surgical profession as a whole. In the United States it was at first a matter left to the common law, and the customs and practices elaborated under the common law system have been enlarged under the Health laws of the different states. The constitutionality of the health laws and of the status of State Boards of Health has been sustained by the U. S. Supreme Court. Justice Field delivered an opinion in the U. S. Court of last resort, Jan. 14, 1889. "Few professions require more careful preparation by one who seeks to enter it than that of medicine." Later the Judge admits the possibility of new modes of treating disease being discovered, and that the law is elastic enough to cover these. "The same reasons which control in imposing conditions, upon compliance with which the physician is allowed to practice in the first instance, may call for further conditions as new modes of treating diseases are discovered."

Now what was the extent of Osteopathy? This we would expect to find in the charter of the first school. In that ~~skaraskar~~ charter the object of the original school is expressed thus, "to improve our present system of surgery, obstetrics and treatment of diseases generally, and place the same on a more rational and scientific basis, and to impart information to the medical profession." This plainly indicates that it was not the design to overturn the medical profession but to accept, as a working basis, of the fundamental sciences "usually taught in Medical Colleges" with the purpose of improving upon the methods of

treating diseases. Thus the express, as well as the implied, design was to alter the methods. In line with this the Statute law of Missouri declares Osteopathy to be a "system, method or science of treating diseases of the human body," and while authorizing the special Osteopathic graduate to practice this special system, it admits that, even the Osteopathic system is included under the certificate of the general practitioner of medicine and surgery; because the law expressly says, it does not prohibit the general practitioner from "relieving disease \* \* by any manipulation by which any disease may be cured or alleviated."

The cases that have come up have placed the courts on record in this matter. The decisions have all been based on statutory construction. Judge Rolapp, of Utah, in interpreting the law which states, "any person shall be regarded as practicing medicine \* \* \* who shall treat, operate upon or prescribe for any physical ailment of another for a fee," says, "there is no suggestion in the section that the word treat referred to treating with medicines or any other specific agencies of a similar kind. If such treatment was done by the naked hands and for the purpose of curing ailments of another \* \* \* it seems to come logically within the intention of the statute, which defines such treatment, handling or manipulation as practicing medicine." In the Appellate Court of Illinois, Nov. 1896, the court says, "he professes to be able to diagnose and advise in respect to a long list of diseases, and to furnish discriminating and efficient treatment to those who may come to him, and while he may rely wholly upon manipulation, etc., yet he professes to have skill and judgment in these methods so as properly to adapt the treatment to each case. \* \* \* Medicine is the art of understanding diseases and curing or relieving them when possible. \* \* This act is not restricted to any particular methods or remedies."

How can we explain the decisions in Ohio, Kentucky, etc? In Kentucky the statute was construed by the appellate court to refer to those only who were exercising the calling of physician, according to the methods in vogue at the time the law was passed, so that any person of any other school of medicine or system of healing desiring to practice may do so without violation of the law. This is right because, as the supreme court has declared, new methods require new conditions. The Osteopathic method is a new method; therefore it requires the application of a new principle, or principles. This does not mean, however, that Osteopathy is not a scientific method. The osteopathic physician does not stand on the same plane as a trained nurse, nor can scientific Osteopathy permit its method to be characterized as rubbing, kneading, etc.

We take the stand that we have an INDEPENDENT SYSTEM, the primary object of which is to present an improved method of dealing with surgery, obstetrics and the treatment of diseases as general, from an independent physiological standpoint. This calls for its acceptance by the law as a system of equal standing with the other systems and especially calls for recognition in connection with the State Boards of Health. If the osteopathic profession will unite on this basis, they can demand representation on the Boards and the law will undoubtedly sustain them in this contention. Meantime we must defend and demonstrate the dignity of our system, as a scientific system, one not to be placed on a par with the bath-attendant or the nurse,



but on a level with any and every other physician.

Where then does the osteopathic system and profession come in? According to use the ARS MEDENDI means the healing profession, even in Indian days when the medicine was a charm, or in early Greek days when prayers, sacrifices, diet and the powers of nature were dominant, as well as in the days when blood letting held full sway. Chemical theories of medicine undoubtedly predominated for centuries, but with the development of modern science arose the tendency to "mechanical explanations of life and disease." From the 17th century onwards the history of medicine is practically the history of schools or systems, based on theories. Developing from and dependent on the Harveian doctrine of the circulation, we find the first symptomatic attempts to explain vital activities on a scientific physiological and physical basis. Among these Borelli, of Naples, 1680, attempted to explain the actions and the functions of the body on mechanical principles, bone and muscle movement on the theory of leverage, digestion as a trituration process, secretion and circulation on the principle of vessel tension. For a long time after this chemistry was introduced to explain the actions and reactions of functions in the vital activities, but the mechanical idea was not lost.

Dr. Pitcairne, a Scotch physician, who after became a professor of medicine in Leyden University, his pupils Cheyne, Mead and Boerhaave, presented some very remarkable contributions to mechanical explanations of life and disease, especially fevers. At the same time, and a little later, William Cullen and John Brown, under the influence of physiology, emphasized the importance of nervous action and excitability, according to which the entire phenomena of life, in health as well as in disease, consist of stimuli. This led to the celebrated anti-depletion doctrine, that, instead of blood letting, the majority of diseases demand stimulation. The modification of this same principle gave rise to Hahnemannism, to which was later added by Hahnemann the principle of dynamization, on which homeopathic potentialization rests. Anatomy, physiology and physics have been the great powers in developing our modern system. Broussias attempted to find an anatomical basis for all diseases, the great irritation causing most diseases being gastro-intestinal, to which system he gave the name *Medicine Physiologique*. Standing out like beacons along the line of this mechanico-physiological development are the names of John Freind, who attempted to explain life and disease mechanically; Hensler, of Kiel, and Ling, of Stockholm, the founders of the principles of movement and manipulation applied to diseases of the body. The massage movements of Letzger and other masseurs represent simply a few of the passive movements of the true *Schwedische Heilgymnastik*. This system dates from 1812, the period of the foundation of the great institution at Stockholm. Osteopathy in America represents the independent mechanico-physiological system which is the natural heir to all these traditional principles of nature.

This will make plain the idea, that we are reverting to the original conception of the art of healing, according to which the physician was primarily a surgeon. Confusion undoubtedly arises because some get the idea that Osteopathy is a branch of medicine. This is

incorrect. Allopathy, homeopathy, eclecticisms, physio-medicalism are not in any sense branches of medicine, but they are separate and independent methods or systems, each of which deals with all the-branches branches of medicine and surgery. Ophthalmology, otology, obstetrics, dermatology, etc. are branches of medicine.

Osteopathy is a method of treating diseases of the human body, and is so declared legislatively by several sovereign states. The original design was to improve our present system of surgery, obstetrics and the treatment of diseases; in other words, to alter and improve the system, tantamount to the formation of a new system, of a scientific character. This makes it plain that osteopathic work is new in methodology. The anatomy, chemistry and physiology are the same, but these are put in a new light, on a new basis and explained, in relation to life both in health and disease, from a new standpoint. But then we apply this new method or system to all the branches of the healing art.

This brings us then in close relation to that profession, whose aim has been from time immemorial to promote the health and prevent the unhealth, as far as possible, of the individual and the community. This brings us into line with that policy which, from the professional side, is represented by the general medical profession and from the legislative side by the Health laws. Hence we would classify our profession as follows, taking health as the basis:

#### OBJECT AND PURPOSE OF HEALTH LAWS AND SYSTEMS OF PRACTICE.

|         |                      | ( METHODS.                                   |
|---------|----------------------|--|
| HEALTH. | (1. preservative of, | (the ars melendi, (1. Allopathic (Applied to |
|         | (2. restorative to,  | (including medi- (2. Homeopathic (medicine,  |
|         | (3. preventative of  | (cine, surgery, (3. Eclectic (surgery        |
|         | ( unhealth,          | (obstetrics, (4. Physio- (being alike        |
|         | (                    | (state medicine, ( (in all.                  |
|         | (                    | (etc. (5. Osteopathic (Applied to            |
|         | (                    | ( ( (medicine,                               |
|         | (                    | ( ( (surgery, etc,                           |
|         | (                    | ( ( (the whole                               |
|         | (                    | ( ( (healing art                             |
| (       | ( ( (on reform       |  |
| (       | ( ( (basis.          |  |

This has the advantage of enabling us to create a new word to express our reformatory method applied to the entire healing art. Besides it gives to us status, (1) professionally, because we claim to represent therfore reform school, in a profession already existing. We are not egotistic enough to claim that the healing art and profession did not exist before we were in it.. Neither can we claim that we alone have a right to be regarded as professional. (2) In the eyes of the law. Health laws, medical laws, etc. existed before we did. The records of the highest legal tribunal give us this status if we represent a new mode of treating diseases. This is just what we do claim.

If we place Osteopathy in its true light as a new method, applicable to the whole art of healing, including surgery, we can give the Osteopath an education and gain for him a status equal to that of the practitioners of the other schools of medicine. His pathy is a pathy as truly as allopathy, homeopathy, etc. and gives him qualifications to meet all cases himself, without recourse to any successful and prominent practitioner of any other school-- in fact, it makes him so that he can settle in any locality, however small or scattered the district population, and appeal to the people, not simply for chronic and incurable cases, but for every case that means unhealth. This we consider true loyalty to Osteopathy.

This is the age of progress. In no branch of science do we expect to find forward movements more pronounced than in the field of medicine and surgery. New fields of knowledge are being opened up, adding wealth to the science of preserving and prolonging life and restoring health to the human organism.

Since man began to exist, sickness, disease and death have been on the wing. Under these circumstances man's sole ambition is to be cured. The history of the healing art presents many changeful epochs. Old systems have given place to new ones and yet imperishable truths of human anatomy and physiology have been added from age to age, until at the dawn of the twentieth century it would certainly be a marvel if the profession did not understand the principles underlying health, soundness of body and mental equilibrium.

No discovery of modern times can claim equal importance with the discovery and application of mechanical diagnosis and mechanical treatment. Surgery for long years, practised by the conservative few, represented this mechanical principle. America of all civilized nations seems to have run far ahead in complete prostration to a drug system, to such an extent that many of the qualified practitioners know little else but pharmacy and the materia medica of drugs. Star after star on the horizon of the healing art, from the days of Hippocrates to the days of Keith and Hilton, have contra-indicated the use of poisons, while the profession and the populace have been eagerly longing for a surer method of nature. Many seem to have caught an inspiration by the wayside and little gems of wisdom are found scattered along the pathway of medical progress as stars of hope pointing the way far forward and the prophecies of future success.

Among the few searching for a new light, we recognize A. T. Still. Finding that drugs did not avail to cure disease, he turned to nature and became a student of human anatomy. He reached the conclusion that the body is a mechanism, delicately constructed, finely adjusted, built on the principles of order and continuity and operated by the laws of physics, chemistry and physiology, such as we find embedded in the human organism. This opened up the mechanics of the circulation and the physics of nerve force; muscle, bone, ligament and every tissue and fluid of the organism being subject to some mechanical principle, or giving a definite response in connection with manipulation. To this he gave the name of O S T E O P A T H Y, - the charter thought being that the bones could be used in the execution of this mechanical theory as a medium of leverage for the application of stimulation or inhibition, or the correction of lesions.

Around this primal conception has gathered all the fruitage of nature in the field of the healing art and to this beautiful clustering system of nature therapy we apply the name OSTEOPATHIC MEDICINE AND SURGERY, not Osteopathy, Medicine and Surgery. It represents a perfect profession whose aim is to build up a perfect science and a perfect art, capable of dealing with all diseased, deformed or misplaced conditions without the aid of others and without recourse to "butcher" surgery or to "drugs", exert as antidotal in the realm of toxicological medicine, and anaesthetic in surgery.

This is not the place to defend the science and the art. It has stood the test and being proved it has not been found wanting. Many misunderstand what it is. It is not spiritualism or any form of mental healing. It is mechanical diagnosis, mechanical therapy and mechanical surgery on a physico-physiological basis. Its fundamental aim is the restoration of the continuity and communion of organs and parts of the body so as to preserve chemical, physical and physiological integrity.

But are we right in saying that Osteopathy is a method of the ars medendi? Is it not something more? Decidedly, no. The statutes which legalize osteopathy state rightly that it is a METHOD, SYSTEM OR SCIENCE, making these three words alternative expressions. "All method is a rational progress, a progress toward an end," says Sir W. Hamilton. Now, why did we say there was a new methodology? Because that covers the entire ground. The basic sciences are the same as those at the basis of other methods, chemistry, anatomy and physiology, including biology, because all the knowledge of science is ours as well as theirs. Where is the difference, then? Our interpretation of the facts of these sciences as bearing on the organism is entirely new. What does this method include? We have said before that the osteopathic principle includes a new view of that science or system whose fundamental aim is to preserve and restore health and prevent unhealth; and this new method includes diagnosis and treatment. A new view of the conditions or diseases at the basis of unhealth represents the fundamental philosophy of this new method; and a new view of the manner in which these may be dealt with so as to cure disease, prevent unhealth and make life more tolerable under abnormal conditions represents the practice part of our method.

In other words, here we have the theory and practice of Osteopathy included in the new methodology, and this is applied to the treatment of all diseases. Thus the great science or system divides itself into two great subdivisions:

(1) The philosophy of life, health, etc., in relation to the organism, including what we call the principles of Osteopathy, and especially that fundamental doctrine of vitalism which lies at the foundation of the new ideas of diagnosis and therapy;

(2) The different methods of applying this philosophy to all the different branches of the ars medendi.

So far the philosophy of Osteopathy remains an unwritten chapter. Some important articles have been contributed on the theory of the treatment of the spine, on the theory of inhibition and stimulation, on the relation between the correction of lesions and the restoration of health, on the relation of nerve energy to physiological functioning,

but no one has yet lifted the veil and stated what is abnormal behind the mechanical lesion of bone, muscle, ligament, blood, etc. that causes disease and unhealth. The principles of Osteopathy as we have discussed them are simply a preliminary chapter in the theory of the practice of Osteopathy. In this field some splendid work has been done, but much remains to be done in the deeper field of chemo-biology.

A method has its basis ideas represented by philosophy and its practical side; both of these are new and both are included in methodology. As a reform school of medicine we take the well established facts of science, interpret them in our own way, and formulate a philosophy and practice. My idea is that we take the healing art as a whole, and then apply our principles to the practical side of the art. The point of the profession as a whole is that the far reaching influence of this philosophy is co-extensive with disease or unhealth. Dr. C. P. McConnell takes the same position, "our students receive teaching in all branches of medicine save one-- materia medica. When I use the term medicine I mean it in its broadest sense-- not simply drugs, as many people erroneously think." (Practice of Osteopathy). Dr. L. F. Hulett in a well written article on "Osteopathy and Law", *Cosmopolitan Osteopath*, Jan. 1900, speaks of Osteopathy in this all comprehensive sense as "the fourth school of medicine." The *Cour De Cassation*, the Supreme Court of France, has decided a question which has been before the courts for seven years, that the treatment of disease by magnetic healing is the practice of medicine, in the wide sense. The court set aside the defense, "because it cannot be maintained nowadays that medical treatment is limited to the administration of drugs."

The A. A. A. O. convention at Indianapolis declared "that we formally record our determination to raise this standard \* \* \* \* until it shall include every department of therapeutic equipment with the exception of materia medica." (Minutes, *American Osteopath*, Vol. I, P. 112.) Dr. A. G. Hildreth at that same convention presented this liberal conception, "That Osteopathy is the practice of medicine in its broadest sense no reasonable minded man can deny, for he who heals the sick by manipulation, with a tub of hot water, or in any manner whatever, is a practitioner of medicine in the sense of healing disease."

The same physiological principle is applicable to a surgical operative case as is applied to a displaced hip or an acute attack of fever. It is the principle that remedial action is from within, not from without, and that nothing extraneous needs to be supplied, except the food elements. If we had a surgical case in which there is something in the form of tissue growth or element dangerous to the organic life, we admit it should be removed, because dangerous to life. Who shall do it? If you hand it over to a prominent and successful surgeon, then you give up the case, because no surgeon of that status today would undertake it with outside interference. The case is his, that ends osteopathic work. Now, there is no time when such a case demands Osteopathy so much as during, immediately before and after the operation. It is along these lines that we reason in claiming for osteopathic principles a surgical application. Surgical diagnosis, surgical operation, the before and after treatment, should be entirely osteopathic.

If anyone questions our point, that a case must be handed over to the surgeon entirely before operation, we would refer him to the code of Ethics of the American Medical Association, to which most of the prominent surgeons belong. "No one shall be considered a fit associate in consultation whose practice is based on an exclusive dogma." This rule "ostracizes from the pale of professional intercourse and consultation any person who believes contrary to what the Association thinks he ought to believe". This makes it that every surgical case must be handed over to the operator. We believe Osteopathy has a principle applicable to reformed surgery. Let us train to that end, to give to suffering humanity the full benefit of our practice.

Dr. G. W. Guthrie makes quite an extended attack upon Osteopathy along with other systems in his address as President of the Pennsylvania State Medical Society, at Wilkesbarre, Pa., Sept. 18, 19, 20, 1900. (Reported in full in MEDICAL NEWS of Sept. 29, 1900). He speaks of "medical nonsense and knavery", quackery, etc., in the same breath with credulity, folly, while he commiserates the condition of his weak brother, who "forgets his birthright" to "become an adherent of Osteopathy." We do not vituperate. We wish simply to correct egregious mis-statements and perversions of the truth. The keynote of the address is, "Every method of treating disease is illegal but mine," whereas the law takes no cognizance of methods, but forbids discrimination. He says that Osteopathy "accounts for all diseases by a fanciful pathology;" forsooth, that is fanciful which the fingers, hands and eyes can detect and X-radiance has abundantly confirmed. "Osteopathy discards the germ theory of infectious diseases, throws aside all the discoveries of bacteriology \* \* \* substitutes in their place simply manipulation." He goes on to identify suggestion, supernatural agencies versus "the human physician" with Osteopathy. As a matter of fact there is more of the human physician in Osteopathy than in the refined mysterious potency of drug, both from a diagnostic and therapeutic standpoint. Health is the natural state of the organism, disease an unnatural, abnormal functioning of certain structural parts. Physiological processes are stimulated, pathological processes inhibited through the agency of mechanical manipulations. Our theory of Bacteriology is that of Pasteur, Kierpe, etc., that there must be a field in the unphysiological or mal-nutritional condition of the body before germs can act as an exciting cause of diseases. Ours is a severe corrective process of treating disease, using the principle of adjustment and the methods of mechanical rather than chemical stimulation to regain the physiological control of the mechanism. Disease is material with us, diagnosis is physical, treatment is material and natural, so that this disposes of all vagaries about a fanciful system.

We do not repudiate surgery. We do repudiate "butcher", "unsexing", "frivolous" surgery. We apply the principles of osteopathic physiology to surgery, mobility versus immobility, limiting operative surgery by this fixed maxim, "removing abnormal tissue growths or tissue elements when these become dangerous to the organic life." Dr. Senn, one of the greatest surgeons of this century, admits that in appendicitis, that fruitful field of operations, eighty per cent get well without operation. If so, that is a fair division of labor, eighty percent for the non-operative Osteopath and twenty percent for the surgeon Osteopath.

Dr. Guthrie quotes the opinion of Examiner Opp in the case of the Wilkesbarre school application for a charter, "a medical practitioner is one whose business or profession is to heal diseases, whether it be by drugs, medicine, electricity, hot or cold water or massage; that the word medicine in such statutes is used in its broadest sense and means any curative agency." So say we, although in some states it is a question of statutory construction; in the general sense, however, the practice of medicine is the use of any curative agency. So it should be. The law cannot legislate out blood letting and legislate in drug giving. That is a matter that depends upon the evolution of the curative science; and just as the history of the curative science shows that physicians did not always cure by the use of drugs, so the modern history of the curative science shows that methods differ and uniformity is impossible.

Dr. Guthrie makes a statement which we endorse with the modification suggested in italics (underlined). "For myself I see no justification for medical sectarianism; all honest investigators, all men liberally educated along medical lines, embracing the fundamental branches of medical education; anatomy, physiology, chemistry, therapeutics (of any school or system), pathology, bacteriology, surgery and the practice of medicine (the curative application of any system of therapeutics)-- all these ought to be united under one banner in the contention against charlatanry, quackery and deception of every kind."

The laws in several of the states recognize the osteopathic system. This places it within the realm of therapeutics and practice and makes its reputable representatives "honest investigators in the eyes of the law" and the standard of education laid down demonstrates that they are "liberally educated along medical lines." We wait for the carrying out of the liberal proposition of Dr. Guthrie to "unite under one banner" in the unprejudiced practice of a noble profession, that of relieving sickness, suffering and deformity.

The question arises, then, Can we speak of osteopathic therapeutics? That depends on our answer to the question, what is therapeutics? Also, upon whether it is empirical treatment founded upon experience and conforming to no known laws, or whether it is rational, that is, based upon well known principles of chemistry, physics, physiology and pathology. Dr. J. Mitchell Bruce, in his *Materia Medica and Therapeutics* thus defines rational therapeutics: "The following are the four foundations of rational therapeutics: (1) Inasmuch as the organs act in obedience to natural forces in and around us; (2) since we possess the power of controlling these forces; (3) since disorder and disease are but the physiological phenomena, or the anatomical results of the disturbing action of ordinary or extraordinary influences; and, (4) since the functions of the organs, and, it may be, even their anatomical state, will return to the normal, if the influences become normal; it logically follows that therapeutics as a science consists in bending to our will the numerous natural forces which affect the human body, or in counteracting or neutralizing their effects by other forces, until, in either case nature returns to the normal. To handle as it were, the natural influences which surround us in such a manner as to effect this change on the functions of the body, is called treating the disease or disorder of it." In another section, he says, "We possess a certain power of interference, a con-

trol over the conditions and circumstances of life, and thus a certain control over the health or physiological state of the individual. We can alter the food we eat, the air we breath, our clothing, our source of heat; we may admit into our bodies substances which we find in nature-- mineral, vegetable, animal, or altogether artificial. On the other hand we may voluntarily shun or reject such substances, and avoid many influences, whether for good or for bad, around us. To express this control which we have over our organs and functions, through the conditions to which we can voluntarily subject them, we say we act physiologically upon them by such and such means." Here we have a sentiment comprehensive enough to take in Osteopathy. Can we osteopathically control the organism in its organs and functions? I think we have demonstrated that we can and the admissions made by learned men from whom we have quoted, demonstrate that such control can be exercised by mechanical means. This places Osteopathy within the realm of therapeutics, with every nature adjunct, diet, hygiene, etc., as a part of our INDEPENDENT SYSTEM.

If osteopathy amounts to anything it is founded on principles and is scientific, both in its fundamental principles and in its methods. There are different diagnostic principles, accurate and specific forms of treatment, and these are based on physiological principles that are definite and certain.

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THE PHILOSOPHY OF OSTEOPATHY.

If we have a system and that system represents a method of healing, there must be an underlying philosophy basic to the system.

Dr. H. Powers says, "the tendency of modern research is to show that all those acts and phenomena which were formerly regarded as the results of the operation of a special force, the vital force, are to be explained by the ordinary laws of physics and chemistry." Here we undoubtedly have the tendency expressed towards pure and simple materialism. But there are many facts unexplained by such simple processes. The chemistry of the evolution of the hydrochloric acid, the physiology of nerve impulse propagation, the formation of the secretory substances of the body, etc. still demand that we postulate the vitality of the body and the vitalism of every constituent cell. The chemistry of the body is vital chemistry and the mechanics of the organism is vital mechanics, for the body is a living mechanism and a living chemical laboratory. Now that we know the anatomical structure, chemical and physical changes in functioning of the body, the main problem of physiology is, to explain how the living body can do what the deadbody cannot do, namely, restore its lost energy through the renewal of its substance, and give out from itself, not only a certain amount of free energy, but a definite kind of such energy, both determinate and specific.

Osteopathy stands pledged to this wise conception of the body organism, and although it cannot fully explain the how and why of chemical, mechanical and vital reactions and relations, it begins the new century with this large field of research before it and dogged determination to stick to its guns till all these problems are solved.

Dr. H. W. Pierson in the Hahnemannian Advocate defines disease "as a disturbed relationship between the vital force and the organism over which it has control." Hahnemann defined the vital force, "that immaterial, automatic energy which animates the material body of the organism, rules with unbounded sway and keeps all parts in harmonious operation as regards both sensation and function." As Dr. Pierson justly says "material substance, in and of itself, does not possess the property of action. It must be acted upon. The energy or force which permeates the material substance must be the cause of all activities. It follows as a logical sequence that all chemical action and reaction in the human organism is due to the primary elements which constitute the substance thus brought into intimate relation. \* \* \* All growth and development is dependent upon the power of this vital force or energy within the individual cell to appropriate, from the common supply of nutritive material, such elements as may be necessary for the repair of all defects. \* \* \* Every substance exerts its peculiar influence upon other substances only through the medium of the vital force. \* \* \* The normal, natural function of the

vital force is so to act upon all material substances coming within its influence that new material may be prepared in nature's laboratory for the maintenance and development of the functional activities of the organism." This is a splendid statement of the philosophy of vitality from an osteopathic standpoint. We mechanically remove obstructions that hinder free play of parts of the body, stimulate or inhibit the articular and other sensations, so as to give free play to nature in the distribution of its energy, so as to restore the harmony and equilibrium of the parts to each other and the whole.

Dr. D. L. Tasker has come nearer striking the keynote of the true philosophy of Osteopathy than any one else so far, in his statement, that "it is the vital and not the mechanical principle which keeps up a condition of maladjustment. \* \* But why does the work have to be done over and over again. Surely this is evidence that the vital element is controlling what we choose to call mechanical lesion."

These are significant words and contain a deep mine of philosophy that as yet we cannot fully understand. Almost ten years ago in the first lecture we delivered in the department of physiology in the American School of Osteopathy we took the same ground. "Life is that science and art of relations, physical, chemical and vital, which gives us certain phenomena that we characterize as manifestations of vitality. \* \* \* The properties or relations of the human body are chemical, physical and vital. These relations, when harmoniously sustained through a succession of time in the individual organism, constitute life from a physiological standpoint. Any interference with or interruption of these harmonious relations constitutes abnormal vitalism and causes life to consist of abnormal manifestations of those phenomena that depend upon these relations, chemical, physical and vital, resulting in disease, deformity, abnormal functioning or structure."

In the January, 1901, issue of the Pacific Osteopath, Dr. Tasker writes, "the human body is vastly more than a machine; it is a vital mechanism, and the fact that it is vital renders it susceptible to other influences besides mechanical, such as falls, twists, strains, etc. We may truthfully say that when the physiological is overactive, the anatomical alignment is disarranged. \* \* \* Osseous lesions have always been paramount in our work and thought; but muscular lesions now hold an equal place, and bid fair to lead when we see more clearly into the subject." This is an important point and justifies Dr. Tasker's idea that we must not adhere too closely to the conception of mechanical lesions, because "there are diseases not due to misplaced tissues." involving change in function, altered reflexes, etc. Undoubtedly lesion covers bone, muscle, ligament, nerve, in fact any tissue and any function. In correcting an osseous lesion one point sometimes overlooked is the effect upon the articulations and through the articulatory sensations upon the body vitality enthroned in the central nervous system. Every tissue structure and every functional activity sustains some definite relation to that vitality which animates every tissue of the body.

This is not a new idea. We have seen it in germ at the close of the eighteenth century. Richerand regarded the majority of diseases as derangements of the vital functions, hence curative principles should be applied, with the view of restoring sensibility and con-

tractility to the normal. DeLys classifies diseases under the heads of, (1) physical derangements, (2) organic alterations, and (3) vital lesions. "Life consists in the action of stimuli on the vital powers," says Richerand, and any variation in these ~~stimuli~~ stimuli causes unhealth. Hence to "excite and direct" the activities of what he chooses to call "sympathy" furnishes the most important principle applied in overbearing disease. This does not mean that osteopathic principles prevailed at that time, but that the germinal principles were in the process of evolution. Hilton's use of pain as an indication of nature's demand for rest is along the same lines. Hilton's by showing that the skin, muscles and synovial membrane of a joint, or the skin and muscles of the abdomen and contents covered by peritoneum are innervated from the same segment of the cord, laid a foundation for the rational use of inhibition in osteopathic practice." Thus Dr. Tasker places in the proper light the relation of older scientific truths to osteopathic theory and practice.

What is the necessity of this philosophy? Dr. C. M. T. Hulett aptly says, "it is a philosophy which profoundly affects, not only the superstructure, but the substructure of our knowledge of life manifestations and limitations." Dr. W. E. Quine, says, "Medicine is but the servant of nature. It may stimulate her to more energetic effort; it may restrain too violent action; it may guide aberrant action; but its power is in all cases limited to the modification or support of the natural processes and it is the natural processes themselves which effect restoration to health." (Philadelphia Medical Journal, Dec. 16, 1896,) Dr. Hulett writes, "this indicates the position to which even the users of drugs are coming, but I believe there is one very important differentiation which may be insisted upon, even in this statement or rather in its application, which is, that drugs can only affect destructive metabolism, constructive metabolism is wholly within the control of the organizing principle (extra-materialistic) organizing principle, the source and spring of function. Drug medication conforms to the materialistic evolutionary idea that 'form determines function,' while Osteopathy must of necessity rest on the more modern idea that 'function determines form'. \* \* \* The medical world generally taught that the sick body needed extraneous help. Our people taught and proved by their work, that it did not. In order to maintain our position forensically, we must show why it does not."

This puts very succinctly and truly the real question of the philosophy of Osteopathy and what we are looking to science, especially the chemico-biological sciences, for the solution of. President Japp in his presidential address before the chemical section of the British association for the advancement of science, brings forward some interesting points on the chemistry of bioplasmic substance with a view to the solution of the relation of vitalism or vital activity to chemical changes.

There is a work that will be read with profound interest by all students of osteopathic philosophy, Prof. Loeb's work on the "comparative physiology of the brain". We cannot accept of a great many of his statements and conclusions, especially in the field of psychology. It is in the field of biology that the strongest part of

the work is found. His conclusions are purely materialistic, for example, happiness "is the natural and harmonious expression of a man through his instincts."

If Dr. Loeb's theory is correct, the law of nerve force based on the series of centers in the central nervous system is incorrect, the structure of the central nervous system being comparatively simple, the difference in muscular and organ activities depending on "the varying complexity of the muscles or organs themselves." He defines a reflex, which is the most simple activity, as "a reaction which is caused by an external stimulus, and which results in co-ordinated movements." The only essentials to such reflexes are "irritability and conductivity," and every nervous reaction, however ~~easy~~ complex and complicated, can be analyzed into component reflexes. This makes the central nervous system only an assistant, because it is not "the presence or absence of ganglion cells which determines the spontaneous rhythmical contractions, but the presence or absence of certain ions, the cause being a chemical one"; "the nerves and ganglion only play the part of a more sensitive and quicker conductor for the stimulus," the physical qualities of the bioplasmic substance determining activity. In the actinian and the starfish we find positive and negative geo-tropism, a force which turns to or away from the earth, the plant exhibiting helio-tropism by virtue of the force turning towards the light. In all these cases this tropism represents vitalism just as other small animals move away from the light into dark crevices in connection with negative heliotropism, the nature of the reflex depending on "the disturbing (negative) or non-disturbing (positive) chemical stimuli."

Dr. Loeb concludes that "the central nervous system does not control response to stimulation; it merely acts as a conductor from the point of stimulation through which the weaker stimuli may pass and pass more rapidly than would be possible if the muscles were stimulated directly. In worms direct impulses flow from the neighboring muscles to the muscles that have been deprived of the ganglion, while in vertebrates, as soon as the spinal cord is destroyed, the protoplasmic connection between the skeletal muscles and the rest of the body is destroyed and it is not possible for stimuli to be transmitted." The brain, representing the great mass of ganglion cells in its cerebral hemispheres is necessary for "associative memory" being simply a terminal "appendage to the central nervous system," injury to these areas affecting the segmental fibers which lead to the destruction of "the use of the organ or muscles to which they lead."

Among his conclusions we find, (1) "the reflexes are determined chiefly by the structure of the sense organs, or of the surface of the body and the arrangement of the muscles." (2) "The central nervous system participates in these functions only as a conductor." (3) "The true problem with which physiology is concerned is the mechanics of protoplasmic conductivity. This problem is no longer a biological problem, but a problem of physical chemistry." (4) "All the so called psychic phenomena are functions of the associative memory."

In the search into the physical nature of associative memory we must look to physical chemistry for a solution. The simple reflex

represents the reaction of an organ or group of organs to a stimulus; while instinct represents the response of the entire organism, "a chain of reflexes." When "all the instincts can be maintained at a certain optimal intensity" then there is the resultant happiness.

Dr. Loeb calls attention to the chemical side of organic reactions. If it is true that the structure of the sense organs, the skin, muscles, etc., determines the nature of the reflexes, we have here one important principle bearing on the osteopathic philosophy of lesions. The unimpeded distribution of the vital force, whatever that may be, depends upon the preservation of the normal form of the muscles, skin, bones, articulations, etc., because when these are abnormal reflexes, and these give rise to unsympathetic conditions of the organism, the natural vital processes are inco-ordinated, which means unhealth. This idea gives confirmatory value to the principle of Byron Robinson in regard to the trunk brain. We require to extend this principle, however, beyond the trunk brain to what we might call the peripheral brain, on the analogy of the peripheral heart, compared with the central heart, these peripheral brains representing the activities of all peripheral parts in which we find the terminal forms of nerve tissue. This is the principle that lies at the foundation of orificial surgery, which attempts to free from obstruction those terminal forms of nerve tissue in connection with the other tissues, such as muscle, when the inhibitory action is so strong that release is impossible otherwise, in order that the vital force of the organism may be free and unobstructed in its distribution through the organism.

The same principle will apply to all osteopathic work, displacement of bone, muscle, ligament, perverted articulations, interference with fluid motility and nerve conductivity, represented by the modified irritability of pain, tenderness, paralysis, etc., indicating that anomalous condition of the normal reflexes which throws the organism out of sympathetic coordinate working order and produces unhealth. The principle of correction or removing obstruction and interference would thus naturally be the primary idea at the foundation of the practical work. As a secondary idea there would be inhibition and stimulation, physiologically produced by mechanical operation, to correct the distribution of this vital reflex force and thus to equalize the organization from the standpoint of vitality.

Thus from an osteopathic standpoint we will find life to be the manifestation of certain vital phenomena, in connection with

(a) chemical changes on a proteid basis, in relation to potential energy as its manifestation. Here we will find all those chemical reactions brought out in the chemistry of living substance in relation to the vital force. How a new chemical reaction can produce immunity, how the changes taking place in the chemical relations of solids and fluids are the basis of vitality and vital activity-- these and similar problems are as yet unsolved.

(b) Histological changes, taking place on a cell basis in connection with cell divisibility and integrity. Here the Virchow dictum will always hold full sway, that "every animal presents itself as a sum of vital unities, every one of which manifests all the characteristics of life." According to this,

(1) the cell represents the ultimate unit in all the vital activities, and (2) the sum of all these ultimate units, representing the correlation and inter-dependence of the different unit-cells, is the animal-organism, whose perfect function-----

the correlation and inter-dependence of the different unit cells, is the animal organism, whose perfect functioning depends on such unity in vital processes. "The composite of a large body amounts to a kind of social arrangement, an arrangement of a social kind in which each of a mass of individual existences is dependent upon the others, but in such a way that each element has a special activity of its own and that each, although it receives the impulse to its own activity from other parts, still itself performs its own functions. The result of an excitation or irritation may be, according to circumstances, simply a functional process, or the institution of a stronger or a weaker nutrition of the part, without necessary excitement of its function; or the establishment of a formative process which creates more or less new elements." Here the cell is the unit behind every combination of cells in the formation of an organism.

This idea is fundamental to osteopathic physiology and differentiates the pathological histology of the older schools from our own. The unity of the vital processes in connection with the vital force or sympathy of vitalism is necessary for the health, harmony and integrity of the body.

(c) Physiological changes on a definite tissue basis, in connection with functional tissue differentiation, tissue development and organ activity. Tissue consists of certain cellular and inter-cellular elements united together on a differentiation basis, the differential giving us the special kind of tissue. According to this, while evolutionary philosophy gives us function determined by form, and while this may be true in tracing out generic characteristics in the adaptation of the tissues to the form of life, the true philosophy of physiology is form determined by function. Thus Marey says, "muscle can only act under the condition of being attached by its vessels and nerves to the rest of the organism. No portion of the body, not even the bones themselves, which have the least vitality, can be free from this necessity." In other words, vitality and vital relations limit the activity of the different parts. Marey tries to work out the principle of Galvin, "function makes the organ", the bones, the articulations, the muscles being modified by functions, "these changes of function under the influence of the function itself are accompanied by anatomical modifications in the apparatus, physiologically modified." (See Marey's *Animal Mechanism*, Chapter 9, pages 85-101.) Here we have the combination of physiology and physics, or the underlying principles of these two sciences, in connection with alterations of functional activity of muscles, organs, bones, etc., in the production of those pathological conditions that we find in osteopathic conditions. Here we must take account of vitality for the abnormal vitalism gives us abnormal functioning and a change in the form or structure, such as we find in lesions.

All the powers that animate the separate organs and parts of the body unite together and are combined in this life principle. This vital principle is in constant conflict with the inanimate, because the former is living, the latter lifeless. The theory of life in regard to its continued preservation is that of the relation of living to lifeless matter in connection with physiological alimentation, the material molecules entering the organism to be acted upon and in turn to produce chemical (composition) changes and physical (property) or

aggregation changes, reactions in relation to vitality and nutrition. Thus the vital force determines individual life by acting upon and animating that which reacts by becoming a part of the vitalized organism. In connection with this vital principle and the actions and reactions in relation to the chemistry of food, alimentation and assimilation we have that sympathy which binds together all the different organs and parts of the body so as to secure perfect harmony among all the activities taking place in the animal economy. This sympathy is not based upon chemical affinity alone but upon those chemical (compositions), physical (property) and vital (extra materialistic) relations, actions and reactions that are sustained by the organism in connection with vitality. The nerves are not the exclusive media of this sympathy, because some (muscles) which receive branches from the same nerve do not sympathize and some parts of the body are in close sympathy whose nerves have no connection except through the general nervous system. As Dr. Loeb points out, there is an inherent power of reaction to stimulation even after the separation from the ganglion nervous system, indicating that there is no absolute dependence of the muscular systems upon the nervous system, the principle dependence being that of conductivity. This is due to vitalism; it is not due to chemical reaction alone. We incline to the belief that it is due to chemical, physical and vital reactions, for the organism or part of the organism must be capable of being stimulated, capable of conducting the stimulation and of reacting in response to the stimulation. All of these are vital properties. Bioplasm or vitalized protoplasm must be present before these vital properties exist. A dead body has not these properties and it is beyond the pale of our treatment. In other words, the fundamental tissue and organ properties that must be present are mobility, the primary property of all bioplasm, irritability the essential property of all differentiated bioplasm, and conductivity, the most highly organized property of bioplasm. Provided these are normal, all the normal reflex actions are possible; but if they are abnormal, and a chemical, physical or vital change may produce this abnormality, then the resultant reactions are abnormal and a state of unhealth exists.

Here we have that trinity of operations, chemical, physical and vital, that is comparable to the trinity of matter, motion and mind which A. F. Still speaks of as the basic tri-unity of the living human organism. No one of these elements can be omitted, if we are to be a true conception of the organism. To make the chemical reaction alone the basis of our philosophy, as Loeb does, is ultra materialistic; to introduce the physical reaction and unite it with the chemical, gives us the same materialistic philosophy as the other schools of medicine, giving us properties without vitality as the sum of properties; to unite the chemical, physical and vital, even although for the present we cannot explain how such a union takes place, gives us the only rational philosophy of life and health, as well as of disease and death.

What the vital end is we know not. This we do know that the body is not a machine that is wound up and capable of going for a number of years wholly under external influence. The moulding and shaping of the organism proceed from within. Mental function is at the basis of every physical function. Behind the physical acts

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involved in digestion, respiration, circulation there is the mental state which determines the body condition. Recognizing the osteopathic principle that all nature's remedies are stored up in the human system, we have this psychic law of the mind's ascendancy and to carry it out the beginning must be made within. Sudden emotions affect the circulation, heart rhythm, respiration; destroy the secretions, impair digestion and even cause death. If such emotions become chronic, the vital principle becomes perverted in function and perfect nutrition of the system is impossible. Physiological chemistry has demonstrated that such chronic conditions produce toxic substances that interfere with every normal function, and physical equilibrium is impossible under such conditions.

Modern physiology is largely concerned with the chemistry and physical mechanism of the different tissues, organs and functions and in this it gives proper place to two of the reactions of the organism. We must not overlook, however, the vital reaction, whatever that means. Digestive, secretory, excretory, nutritive changes are all fundamentally vital. Virchow's idea comes in here to profoundly modify physiology. All the tissue cells of the body are vital units and every change that takes place, in addition to the chemical and physical processes, depends upon the vital activity of these cells. Every fluid of the body is thus vitalized by relation to the vital force of these cells and bears about with it this essential vitalism. In fact, according to the modern doctrine of secretion no nutrition takes place apart from secretion and secretion is the vitalizing process of association with these vital cell units, or groups of cell units, in glands, etc. Osmosis, chemical analysis and synthesis, are not sufficient to account for the substances found in these secretions; vital cell activity under the active stimulation of the nervous system must be taken for granted. The nervous vital force is there. Pure and simple chemosmosis or material chemotaxis cannot account for these changes.

According to Loeb the germ represents simply a few simple elements consisting of chemical substances. But this cannot give life. The germ is a cell, as such it is vitalized, and the process of development is both chemical and morphological. What takes place in the embryology of a new form of life is taking place perpetually in the renewal of the organism by physiological alimentation, the morphological combining with the chemical, how we do not know, action and reaction producing the net result—new tissue, the repair of old tissue and the equilibrium of nutritive conditions. This cell process is applied to all the tissue cells, the minor as well as the important cells of the body.

Virchow realized the necessity of this vital element. Disease, he says, is "one of the possible phenomena under which of individual organized bodies may manifest itself. The sole ground of all phenomena, healthy as well as morbid, is only life itself, and a disease detached from other life, existing beside it, and being for itself, has no existence. Life is cellular activity and the cell is not the simple vessel of life, it is itself the living part. Life is something given, something rendered possible by inheritance only, and therefore besides the forces permanently united to matter, there must be given a permeating force which is transmitted mechanically from member to member. Accordingly we distinguish in the



living body two kinds of forces- the molecular forces, and the exciting and excited vital force, by the combined action of which in the individual, organic elements, the elementary or cell forces, which we are in the habit of regarding as vital force in the wider sense of the term, are brought into action."

According to this we get the true idea. Disease is not an entity or separate existence, but represents a modification of life or of the phenomena of life. To a large extent, the older conception of disease was that of something actually taking possession of the body as a distinct entity and requiring exorcism. If there is a permanent and a permeating vital force, the one isolating and the other uniting all the individual cell units, then we have a working theory upon which to go in trying to figure out the philosophy of life and health, as compared with death and disease. And here we have a theory that can explain why we do not require an extraneous something added to the system in dealing with disease, but have within the system, those curative principles, forces and elements necessary for the palliation and cure as well as the prevention of disease. We wait for fuller light on this all important subject.

Mechanical lesion is not the only cause of diseased conditions, as there are diseases in which no physical lesion can be found. The lesion undoubtedly may be internal as well as external; in the former case there is a derangement of the vital force, in the latter some mechanical condition. Can we reach the vital force? Certainly, it manifests itself in physical conditions and by physical media. The cerebro-spinal and the sympathetic systems represent the nerve centers and forces at the basis of the voluntary and involuntary, or conscious and subconscious activities. These activities represent processes and the harmonious action of all the vital processes of the body gives us a state of health. Therefore anything that is abnormal in any of these processes has a relation to the vital force and also produces some bad effect upon the body system. The vital force deranged or disturbed opens up a fruitful field for the attack of disease germs. Can mechanical treatment affect this vital force to determine it towards the normal adjustment? It is claimed by some that it cannot, that as the cells of the nervous system are so minute, they can be affected only by some infinitesimally acting substance which will produce a profound change in the cell life. In line with this it is claimed that intoxication, poisoning, auto-intoxication indicates the need of a strong and powerful remedy to affect this mind action in the form of the vital force. That is because people lose their mind in intoxication, become delirious under the action of toxic substances, there we have an evidence of the power of a substance over the mind. It is not equally true, however, that certain mechanical conditions of traumatism produce the same unbalancing, therefore showing that the mind vital force may be stimulated mechanically. The vital force is both subjective and objective, and the mechanical treatment of the nerves and nerve centers reaches this vital force in the most efficient way. This is the open pathway in all diseases, because the vital force first becomes deranged in every disease. All the vital phenomena of nutrition, circulation, etc. are dependent on the vital force. It is not the soul or spirit of life, but the body life, for it may continue in the body even after the spirit is withdrawn until those chemical and physical changes take place which we

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call dissolution. Here then we have that biochemical force which lies at the basis of all body vitality, the abnormal condition of which produced by lesion, over sensitiveness, etc. we call a disease.

### R E F E R E N C E S .

Interesting points along this line may be gathered in Bordeu, "Recherches anatomiques" 1752; Cullen "Practice of Physic" 1769; Barthez "Oratio de principio vitali hominis" 1773; Richerand "physiology", English edition 1819; Liebig, "Die organische chemie in ihrer Anwendung auf Physiologie und Pathologie", 1842; Mulder, "Chemistry of vegetable and animal physiology", translated, 1849; Virchow, "Cellular pathologie", Eng. Ed. 1860- 4th German Edition 1871; Claude Bernard, "Phenomenes de la Vie" 1878-9; Loew u Bokorny, "Die Chem. Kraftquelle im lebend. Protoplasm," 1882 Hering, Zur Theorie der Vorgange in der lebendigen en Substanz, 1888; Hodggs, "Changes in nerve cells after activity" Journal of Morphology, 1892; Earl, "the living organism"; Alex Diesterweg, "Cellular Physiologie." John Fletcher, "Rudiments of Physiology" 1837; Loew, The energy of the living protoplasm, 1896; Latham, (purely chemical view of life) British Medical Journal, Vol. I. p. 629 (1886); Lancet, London, Vol. II, p. 751 (1888); Griffiths Chemical News, London, Vol 48, p. 179; Japp, Chemical, Vol. 78, pp. 139 and 149 (1898), Nature, Vol. 58, p. 452 (1898), and Vol. 59, "Pharmaceutical Journal", series 4, Vol. 7, pp. 359 and 352 (1898); J. Reynolds Green, "Science Progress" London, Vol. I, p. 342, Vol. II, p. 109, Vol. III, pp. 68-376, Vol. V, p. 60; Dyer's Presid. Address, "British Assoc. Reports," 1888; Green, "Proc. Royal Society" London, Vol. 41, p.466; Butschli "Microscopic foams and protoplasm" London, 1891, abstract in "Science" N. S., Vol. II, No. 52, 1895; Bunge, "Physiological Chemistry" trans. by Woolridge, London, 1890; Vaughan, "Chemical Physiology." 3

### L I F E .

By life, used with therapeutic significance and aside from its metaphysical meaning, I mean that known property that manifests itself as ever standing ready to sustain, preserve and restore man's structural body. This living human organism began its existence by the union of two germs, organisms, namely, the male spermatozoon and the vitellus, or fertile spot in the ovum, consisting of two specks of naked living matter. These possess the power of segregation and division into other specks of naked living matter, and then, by a further process of forming cells and embryonal tissues. This power or force has the ability of fashioning all these tissues and organs long before tissues and organs are formed. This is power or force which builds up the body and also sustains it. And we know by actual observation the same force keeps it in motion and repairs it when diseased or injured, to the best of its ability. For convenience we call it the VITAL FORCE. It is self evident that some internal force does actually heal wounds and, in many cases of disease, cures the patient without the aid of doctors or remedies of any kind. Any and all observing physicians are cognizant of this fact. But there are those who claim that all these things are done by physico-chemical forces

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forces outside of the body. And yet when you ask these if they, with all the skill of chemists, can form, by all of the forces at their command, a single cell or do more than tear it down and tell us its chemical equivalents. This they freely admit, but attempt to put us off by claiming that at some future time they may possibly be able to do this. It seems to me that such minds are striving to uphold an evident absurdity. Because nowhere, except under the dominion of the vital force, can such results be accomplished. And yet these men attempt to make us believe that physics and chemistry, by some hocus pocus arrangement, does things that they themselves cannot explain. They need not talk about a deranged imagination assuming that something superstitious must be brought in to establish the vital force theory. We discover the effects of this force as certainly as we do the effects of the force of chemistry, or the effects of gravity. There is no more superstition in believing that vital force is the primitive fact or law of physiology, than that chemical force is the primitive fact or law of chemistry. Both of these are amenable to the strictest form of analysis- the one is just as reasonable as the other. These men actually ignore the fact that such results are constantly being accomplished under the dominion of this vital force, and they cannot be accomplished otherwise. Why, they tell us that the acceptance of the vital force theory actually stops investigation. If we have the facts why should we investigate further? When we can demonstrate our theory, then we discover that it clearly enables us to distinguish a vital act from disease. This is something that the physico-chemical theory cannot do, because these same theorists have builded all their pathology on the violation of physiological action. That is to say they pronounce increased physiological actions disease. If so, then the physiological action must be governed by some vital principle, which determines when it becomes physiological and when it becomes chemical or pathological. These are some of the reasons that lead reflecting men to accept the vital force theory of L I F E.

D I S E A S E represents that condition of the tissues or organs of the body in which the vital force is unable to function them properly. Thus we discover that if disease is a condition, it cannot be an increased vital action, like irritation, pain, fever or inflammation. It is a state; a condition, not an action. And as the vital force, like chemical force, is immaterial, it cannot be directly affected by material agents; consequently cannot become diseased. It is the organs and tissues of the body that become affected by material agents and consequently become diseased. As an example, the patient may have had the misfortune to have a fall, and in this accident may have partially misplaced one of the cervical vertebrae; in consequence of this misplacement we may have the nucleus of almost any form of disease. I was called in consultation with a physician in another state to see a patient suffering with what had been pronounced by several prominent physicians cerebro-spinal meningitis. I carefully looked over the case and in the physical examination discovered tenderness in the region of the upper cervical vertebrae. I carefully inhibited this tender spot and then stretched the contracted muscles that were holding this misplaced vertebra out of its normal alignment, and then gave strong extension. By careful articulatory

manipulation I succeeded in replacing the vertebra in its normal position. Instead of that peculiar meaning that had attended almost every breath, the patient became more quiet and soon fell into a quiet slumber. I told the father and mother, who were attending the child, that if the patient slept he was not to be awakened; that I would return in the morning. The medical physician and I went to his home and went to bed. We left word for them to call us if the patient gave them any trouble. The patient got more easy and slept the most of the time during the night. The next morning when we called the patient seemed free from pain and seemed inclined to take nourishment.

Now, what do the above facts indicate? They demonstrate (1) that disease is a condition; (2) that the fever and inflammation were not disease but physiological symptoms of disease; (3) that it was not the vital force that was diseased, because as soon as the obstruction—the misplaced vertebra—was put in position, the vital force stood ready to again function the tissues and organs as before; (4) that it is the duty of the physician at all times to remove obstructions to vital action, and that if this is done, the vital force stands ready at all times to function the body, unless hindered from so doing by the conditions of the structures of the body itself. It is, therefore, necessary for us to build up a theory of some aerial, imaginable disease entity, because we have the actual conditions ever present, if we will but look for conditions instead of some indescribable something, named disease. And, then, we shall fully realize that all vital actions are to be placed on the physiological side because they are produced by the vital force, no matter how imperfectly these actions are performed. I am aware that this is radical ground; nevertheless it is true. I am aware that this is contrary to the teaching of the physico-chemists, who attempt to make man's body simply a chemical workshop, presided over only by physical and chemical force. These enthusiasts seem to forget that all the physical forces have to do with the physical world, while the vital forces of plants and animals are higher and far superior to the merely physical forces. The vital force of man is superior to all others.

#### THE BODY A VITAL MECHANISM.

Dr. D. L. Tasker, in the Pacific Osteopath, says, "the mechanical principles of our bodies are not have so wonderful as the vital, but we, as Osteopaths, have apparently placed before the public a picture of the human body which accentuates every mechanical principle to the exclusion of the vital. We say man is a machine and then stop. HE IS A VITAL MACHINE." This is a very important point that we are apt to overlook and gets us into trouble with men who do not understand our meaning. We speak of a mechanical lesion and mechanical treatment, whereas we mean that a mechanical lesion is evidence of vital abnormality and that mechanical correction restores vital normality, the mechanical converting the pathological into the physiological. Dr. Tasker along this line, says, "the mechanical condition which we call a lesion is only evidence of the lesion which lies in the excessively active muscle or at some other point in close

nervous connection with the muscle. \* \* \* All the mechanical conditions in and around the joint are conducive to quick return to normal. It is the vital and not the mechanical principle which keeps up a condition of maladjustment. \* \* \* Why does the work have to be done over and over again? (reducing a subluxation) Surely this is evidence that the vital element is controlling what we choose to call a mechanical lesion. \* \* \* A reduction is secured by equalizing vital activity. \* \* \* It is difficult to account for the subluxations of the atlas without bringing in the contraction of muscles. This seems to be the most prevalent cause of misplacement of the atlas. \* \* \* Take, for instance, the various twists of the atlas found by osteopathic physical diagnosis, Gray says, "the recti laterales are mainly concerned in the slight lateral movement." This is the movement concerned in a lateral subluxation. Then why not give muscular contraction, or contracture, the credit for this condition?" (Pacific Osteopath, Oct. 1900.)

This idea of interference with vital phenomena as the basis of disease is the essential principle of HILTON, in his classic work on Rest and Pain. He lays it down, that "rest is a most important therapeutic agent in the cure of accidents and surgical diseases"; and a good part of his work goes to demonstrating that nature herself uses mechanical means "to reduce organs after they have been in a state of physiological excitement or turgescence, while performing their appropriate functions, to the proportions natural to their state of rest." This is equally true of the viscerai organs and of the brain, the cerebro-spinal fluid in the latter case performing the same functions in regard to brain circulation as the elastic capsules in the viscera. Over-excitation tends to exhaust or destroy the vital function, as Hilton illustrates in the exhaustion of the excito-motor function of the spinal marrow after a fracture of the spine. In line with this idea he says to the surgeon that he should "fix upon his memory as the first professional thought which should accompany him in the course of his daily occupation, this physiological truth-- that nature has a constant tendency to repair the injuries to which her structures may have been subjected, whether those injuries be the result of fatigue or exhaustion, of inflammation or accident. Also that this reparative power becomes at once most conspicuous when the disturbing cause has been removed; thus presenting to the consideration of the physician and surgeon a constantly recurring and sound principle for his guidance in his professional practice." Thus Hilton makes the first therapeutic principle, the removal of the obstructin cause.

Another principle is associated with pain as an evidence of interference with nerve activity. "Pain, as we all know, is not by itself an indication of an inflammatory state, nor is redness, nor is swelling. \* \* \* Pain in any part, when not associated with increase of temperature (the local symptom of inflammation), must be looked upon as caused by an exalted sensitiveness of the nerves of the part, and as a pain depending upon a cause situated remotely from the part where it is felt. In availing ourselves of these so-called sympathetic pains, I should like to displace, to throw aside the term sympathy as something too ideal, and would ask you to consider such pains in their obvious, intelligible and more natural relation. I would

ask you to regard them as resulting from some direct nerve communication passing between the part where the pains are expressed and the real and remotely situated cause of the pain. \* \* \* If the hidden cause of pain be in any one particular spot, it is only by tracing the nerves of and from that spot that we can hope to arrive logically at the real cause of the symptoms. \* \* \* It is through the medium of the distribution of the cerebro-spinal nerves of sensation (the fifth nerve being the true cranial sensitive nerve) that we are enabled to explain those pains which are called sympathetic, but which result from a continuity of nerves between the cause and the effect, the disease and the symptom. \* \* When a patient complaining of pain applies to the surgeon, the surgeon ought to seek for the real cause. \* \* \* External pain, or pain upon the surface of the body, if properly appreciated, may be considered as an external pain of some distant derangement. If the pain persists- it does not depend on any transient cause- it becomes necessary to seek the precise position of the pain; and as soon as we recognize the precise position of the pain, we are enabled, by a knowledge of the distribution of the nerve or nerves of that part, to arrive at once at the only rational suggestion as to what nerve is the exponent of the symptom. By following centripetally the course of that nerve, and bearing in mind its relation to surrounding structures, we shall, in all probability, be able to reach the original, the producing cause of pain, and consequently to adopt the correct diagnosis."

Along this line Dr. Embleton in a paper published in 1870, presented to the British Medical Association, explains the shoulder tip pain, on the basis of its origin in the pneumogastric filaments which enter the hepatic plexuses, "and that then by the intimate connection between the vagus and the spinal accessory it is expressed in the branches of the latter which supply the trapezius and which communicate beneath it with the third and fourth cervical nerves. \* \* \* Its ordinary seat is not in the clavicle, but in the edge of the trapezius rather than in the clavicle, and the trunks of the vagus and the outer division of the spinal accessory, as far as they are amenable to examination, are abnormally sensitive to pressure."

Hilton says that "pain in the anterior and lateral parts of the head, which are supplied by the fifth nerve, would suggest that the cause must be somewhere in the area of the distribution of the other portions of the fifth nerve. So if the pain be expressed behind, the cause must assuredly be connected with the great or small occipital nerve and, in all probability, depends on disease of the spine between the first and second cervical vertebrae."

This indicates the method in diagnosis of tracing pain from the point of distribution to the spinal column. The same is true of superficial pain "associated with some abnormal state of an internal viscus \* \* enabling us by external pain to receive the information and to appreciate slight organic changes or derangements of function of the internal viscera."

Dr. Martyn, in the British Medical Journal, for 1864, explains why dorso-intercostal pain is limited almost entirely to the 6th, 7th and 8th intercostal spaces on the left side. "The aortic arch impinges on the left side of the 3rd dorsal vertebra, and opposite the 4th, 5th and 6th, it received contributions to its plexus

from the corresponding ganglia of the sympathetic, while its plexus again contributes to the heart. These sympathetic ganglia have, however, just received branches from the intercostal nerves themselves; and so it is that the heart and the intercostal spaces (4th, 5th, 6th) are supplied by the same nerves. Now the 4th, 5th and 6th intercostal nerves are those which give off large lateral cutaneous branches, descending over two ribs before they terminate in the skin over the 6th, 7th and 8th intercostal spaces." Thus the pain felt in the inframammary region may be traced to the heart, the sensory nerves entering the spinal cord at the same spinal level as the nerves from the 6th, 7th and 8th intercostal spaces. This may be caused by a sympathetic involvement in the cervical region, a pneumogastric affection also in the cervical region, or some uterine condition, such as leucorrhœal congestion.

Another important principle enunciated by Hilton, is that "diseases of the spine may begin in the vertebrae or in the intervertebral substance—I think upon the whole, most frequently in the inter-vertebral substance, or where this is joined to the vertebra. This rather supports the view that diseases of the spine are very often the result of accident, because we know that in accidents, at least so far as I have been able to discover, the most frequent lesion or injury to the spine is a partial severance of the vertebra from the inter-vertebral substance; and I expect the same thing obtains with respect to diseases of the spine. The pain associated with diseased spine to which I now refer is found upon the skin supplied by the nerves which escape from the vertebral canal through the intervertebral foramina, close to the bones or intervertebral substances, either of which, as I have said, may be the seat of the disease. It is upon the recognition and right interpretation of the cause of this pain upon the surface of the body that we ought to place the best prospect of early and correct diagnosis in spinal disease." Why does the lesion involve the junction of the vertebra with the intervertebral substance? Because "the junction of a more or less elastic body is the weakest spot, and therefore received the full effect of a strain." This illustrates how Hilton makes use of the vital characteristics of nerve expression and tissue vitality as the basis of diagnosing diseases. Numberless other instances may be gleaned from the work on REST & PAIN. For example, in a case of severe abdominal pain, increasing in the erect posture, on both sides just above the pit of the stomach, Hilton, in 1851, found "disease with slight displacement, between the 6th and 7th dorsal vertebrae and pressure upon the vertebrae produced the pain in front."

#### VITAL MECHANICAL ETIOLOGY AND TREATMENT.

Dr. C. V. Mansell Moullin, F. R. C. S., Surgeon at London Hospital, in his work on SPRAINS presents many interesting points in regard to joints, muscles, tendons, etc. The most interesting chapter is that on sprains of the back and neck, from which we cull a few selections.

"One of the most singular features in connection with these sprains is the way in which the backbone itself and the muscular and

ligamentous structures around it, are overlooked and ignored. Even in the ordinary accidents of every day life there is a tendency to lay everything that is serious or lasting to the credit of the spinal cord. \* \* \* Yet it is difficult to see why the other structures should enjoy immunity. The vertebral column may be strained, especially in the cervical and lumbar regions; the ligaments torn or stretched; the nerves bruised or crushed; the smaller joints between the segments twisted and wrenched; the muscles detached from their bed and torn across, or thrown into a state of cramp that they become rigid and unable to act with freedom; or the fibrous sheath which contains them and helps to secure the bones laid open and filled with blood. \* \* \* Sometimes a certain amount of hyperaesthesia or increased sensitiveness of skin may be detected over a small area immediately above the seat of injury, but the general tenderness all down the spine, which is such a common symptom of sprains in the back, whether they occur in railroad accidents or elsewhere, and the strange sensations, such as crawling, creeping or tingling, experienced in the limbs, are probably due entirely to other causes. They are certainly met with in cases in which there is no reasonable ground for suspicion that the cord itself has been hurt in any way. \* \* \* A very large number of the symptoms which are usually considered definite proof that the spinal cord has been hurt, may be, and in a large proportion of instances probably are, due altogether to the injuries that the other structures in the back must sustain in such accidents."

He cites the case of a man who stumbled and fell into the hold of a ship. There was no fracture or dislocation. "The stress had fallen almost entirely on the muscles and ligaments at the back of the neck; these no doubt were severely strained, and it seems probable from what followed that the nerves running from the spinal cord had suffered in the same way. \* \* \* He had completely lost, however, the power of moving his head or neck; the least attempt, especially nodding, brought on severe attacks of pain, shooting up over his head and behind his ears on each side, so that he sat with his chin resting either on his hands, or with his thumbs behind his ears and his fingers grasping the face. He complained of his back and neck feeling weak, as if he were going to be paralyzed. The skin was exceedingly tender to the touch. What caused him most apprehension, however, was the difficulty he felt in opening his mouth. He could shut it easily enough, but slight as is the muscular effort required to move it in the opposite direction, it was almost too much for him. The muscles which act from the upper part of the chest, and help to form a fixed point from which the lower jaw can work, were unable to do their fair share. They had not been injured themselves, but the nerves supplying them had been strained in the neck at the moment of the fall, and were unable to carry the necessary stimuli. For the same reason his breathing was very shallow and his speech slow and deliberate."

Here is a case diagnosed as obstruction to the nerve force. It gradually disappeared, although there was for a long time a peculiar sensation in the neck on turning the head, "as if two roughened surfaces were rubbed against each other, or some dense fluid, such as extravasated blood, were being squeezed to and fro in the meshes of the cellular tissue." After blistering without curing, "forcible manipulation, assisted by thorough kneading, soon affected a cure. \* \*



The whole of the symptoms were due to the damage the muscles and ligaments had sustained, and the way in which the nerves were stretched."

He goes on to point out that paralysis, hyperaesthesia, crawling sensations, tingling, etc. do not necessarily involve injury to the spinal cord "but are rather suggestive of injury to the structures that lie round it and protect it \* \* \* the cord itself is placed in the position of the greatest possible security as far as it can be from any external hurt, so that in the vast majority of instances it escapes.

Of the frequency with which the bones are affected there can be little doubt, injuries of the back, in the shape of blows or strains, have to account for a very large proportion of cases of diseases of the spine; and probably, if the history of the rest could be obtained, it would be found to be true of most of these. A blow may affect any part, but strains, in such a structure as the vertebral column, are always felt most severely where a rigid and flexible segment are joined together—where, for example, the neck or the lumbar region joins the thorax, which from the attachment of the ribs and for other reasons, is peculiarly stiff. At any rate, whether this is the explanation or not, it is a fact that disease of the spine is particularly common at these two spots.

Sometimes the strain falls on the smaller joints between the vertebrae, though it must be admitted that it is rarely possible to find any direct evidence of their being hurt. There are so many of them; they lie so close to each other; and the amount of movement possessed by each is so slight that unless the injury is extremely localized its effect is spread too widely to strain any single one. It is not improbable, however, that they suffer more often than is generally suspected; only the injury, owing to the depth at which they lie, and the way in which they are covered in by the muscles, is not correctly diagnosed.

The structures, however, which bear the brunt of strains, are the band of fibrous tissue, and the muscles on the back and on either side of the vertebral column. With regard to these, the part played by the former is entirely mechanical. Close under the surface there is a broad sheet of extraordinary strength, extending outward over the muscles, binding them down and protecting them so far as it can from being overstretched. A little deeper it is much more delicate and vascular, forming sheaths for all the separate slips and uniting them closely to each other. Deeper still it becomes strong again; but here the fibers are short and irregular in direction, running between the prominences with which the bones are covered, and acting the part of ligaments. This fibrous tissue cannot stretch. When the violence is so great that the muscles are overcome, or so sudden that they are caught unawares, it resists as long as it can; then it gives way, rarely at any one single spot; more often here and there, where it is attached to the bones or becomes continuous with the muscles.

The muscles are the most active ligaments the back possesses. Not only do they move one bone upon another, but, within certain limits, they are the main agents by which the extent of the movement is regulated. When those limits are passed, and, as a rule, not till then, the purely passive fibrous bands are called into play.

Many of these injuries occur commonly in sprains of other joints, but one of them, dislocation, is, if not confined to the back, at least very rarely met with elsewhere. It is most common in the neck, for here the movements are very rapid and extensive, while the muscles are especially long and slender. The head is slowly twisted round to look in somewhat awkward direction; something appears to be caught and the head is held fixed. Careful examination in these cases sometimes shows a tender spot on the contracted side, slightly too prominent. If this corresponds in position and direction to some muscular slips, and if, when the part is manipulated, the swelling disappears, and full and painless mobility is instantaneously restored, it can hardly be doubted that the symptoms were due to the dislocation of one of these, which has slipped back into its place again. In some cases an audible snap can be heard by the patient at the moment of the reduction. I have never met with any unmistakable dislocation in the loins, though, no doubt, from the description given by Callender its occurrence is quite possible. The patient was carrying a heavy weight on his shoulders, when he suddenly slipped, and, in spite of all he could do, was swung round by the momentum. The pain for the moment was intense. On examining the part there was one very tender spot in the muscles by the side of the spine, where a decided irregularity could be detected; this was diagnosed as a dislocation. The patient was instructed to repeat, so far as he could, the movements he went through as he fell; and while doing this firm pressure was made on the painful spot. The swelling disappeared at once; full power of movement was regained and the sensation of stiffness completely vanished.

If any injury of this description, even if the presence of a dislocation is not certain, it is always worth while to carry out some simple manipulation such as that described above. Whatever may be the reason, whether it relaxes spasm, or whatever it does, it is a fact that almost immediate relief is sometimes gained by this, though the symptoms are not in the least characteristic. In one case under my own care there was no history of an accident at all. The patient was a young man, healthy enough himself, but of rheumatic and gouty parentage. He had been sitting incautiously in a draught when overheated and got an attack of muscular rheumatism. Curiously enough the pain was limited to one side, and almost to one spot. In spite of the history I decided to try the effect of sudden vigorous contraction, and accordingly made him sit down on a low seat, with his feet firmly pressed against the wall in front, so that the pelvis should be firmly fixed. The tender spot was carefully marked, and then it was explained to him that he must stoop forward as low as possible, and at the word of command suddenly straighten himself up. One arm was placed under his chest to assist him in this and the thumb of the other hand firmly pressed upon the tender spot. The patient carried out his part loyally, in spite of the pain, and was completely and thoroughly cured at the second attempt.

It is very important in accidents of this kind to get a perfectly accurate account of the way in which it happened, and the smallest details often prove of great importance. The chief difficulty is to determine whether the seat of injury is one of the

smaller joints or a muscular slip by the side of it. Sometimes a soft and rather definite swelling can be made out beneath the skin; more often there is merely a certain amount of local tenderness, with a sensation of stiffness, or of inability to execute some particular movement, amounting in some cases, as has been already mentioned, even to a suspicion of paralysis in the patient's mind.

If the situation corresponds fairly well with the position and direction of some slender slip of muscle, the assistance of the patient must be called in and what is required of him thoroughly explained. There are two chief ways in which the reduction may be effected, sometimes one succeeds, sometimes the other. In the first the patient is placed in an attitude that relaxes the injured part as much as possible, and then, while the hand or finger is firmly pressed upon it, is made to bring it suddenly and vigorously into action. In the second, which is rather the better, for it is very difficult at once, and when suffering pain, to move the back or neck quickly or in any given direction at a moment's notice— the body is placed so that the dislocated slip is put upon the stretch, and held in that position by the operator, while the patient endeavors to straighten himself up against the resistance. The muscle suddenly contracts, alters its shape and consistence, and from the relief that is experienced afterwards must apparently slip back again into its bed. Sometimes there is a sharp feeling of pain at the moment, and the preliminary stretching is always disagreeable, but the use of an anaesthetic is, of course, impossible.

The most common trouble, however, after sprains is something different to this, and is probably closely allied to muscular rheumatism. It may be the result of unusually severe, or of unusually prolonged effort; nothing is felt at the time, or for a few hours; then generally speaking at night a peculiar aching sensation begins to make itself felt. The skin is often tender to the touch, especially over the points that correspond to the exit through the fascia of the cutaneous nerves; But there is no heat or redness. In some cases, no doubt, there is a rupture or straining of the muscular fibers, or there are minute hemorrhages; but from the practical identity of the symptoms with those of myalgia, due to cold or gout, it seems probable that the cause is to be sought in the changed condition of the circulation, or of the nutrition of the part. During contraction of the muscles a much larger amount of blood flows through them than when they are at rest, and the blood vessels are very much dilated. It is possible that when this is carried to excess by prolonged overwork it is succeeded by a condition of passive congestion, the vessels being overloaded, and the blood unable to circulate as freely or as rapidly as it should. Then the waste products accumulate and act as sources of irritation, and fresh material to replace that which is exhausted by fatigue is not supplied in sufficient quantity. Probably in those who are young and healthy this is not of material consequence; it merely causes a certain amount of muscular stiffness, which soon subsides when the part is rested and the natural equilibrium once more restored.

The most common situation for this to occur in is in the loins, owing to the large masses of muscle situated there, and to the

way in which they are called upon for unusual or sudden exertion in lifting a heavy weight; but it may occur anywhere, even in the extremities. It is not uncommon for affections, even of such distant parts as the viscera, to be attended by pain in various regions of the spine. To say nothing of examples which must occur to everyone. I have known the back pain of incipient smallpox treated as lumbago, and massage has before now been vigorously applied to a case of stone in the kidney."

Here we have presented a multitude of osteopathic principles and these are to be taken as examples of other parts of the work of Dr. Moullin, which should be carefully read by every Osteopath. Dr. Walker says, that there are three theories in osteopathic work, "subluxation, muscular contraction and stimulation and inhibition of nerve force." As he justly observes, however, "all three are so interdependent that there is no legitimate division possible." When we apply this idea to such a work as that of Dr. Moullin, we are certainly led to conclude that all of these things combined together give us the lesion conditions of osteopathic diagnosis. We have been asked, does the reduction method of such men as Moullin, Ling, etc., fall under osteopathic work? Can their treatments be considered osteopathic treatments? Dr. C. P. McConnell says, "Osteopathic work is scientific work, consisting in its manipulative treatment in re-adjustment of anatomical tissues." Again he says that manipulative therapeutics includes "certain general movements", "employed to obtain a definite specific result." As I understand him he means that osteopathic work is distinguished from massage and simple movement work, in that it is not a change operation, but that the osteopathic work, sequential upon a definite etiology and diagnosis, represents technique of a specific kind and designed to secure a specific result. Applying this principle correctly, much of the work of Ling, Moullin, Granville, and others would be good osteopathic work, because there is vital and mechanical etiology and vital mechanical treatment, both of which are specific. For this reason their work is most instructive.

While the body is a machine it is something more. A. E. Still puts this principle most aptly when he says, "every living organism has within it, as a special gift from God, the power to manufacture and prepare all the chemicals and forces needed to build and rebuild itself, together with all the machinery and apparatus required to do this work in the most perfect manner, producing the only substance that can be utilized in the economy of that individual. No material other than water and food, taken in satisfaction of the demands of appetite (not perverted taste) can be introduced from the outside without detriment." No principle of modern physiological research ranks higher than that of internal secretion. We have learned that the gland of the body, from the minutest lymph gland up to the largest gland in the body, the liver, are constantly preparing secretions which are necessary for the body development and the loss of which throws the body or parts of it into diseased conditions. Osteopathic treatment, in restoring the body tissues to their normal adjustment and in rectifying function by the use of stimulation and inhibition, can profoundly affect this internal secretory mechanism; and therefore the mechanical manipulation can be converted into its physiological equivalent, the internal medicine of Osteopathy. The serum

therapy of Osteopathy stands on the same ground, and the production of anti-toxins and anti-septic conditions to counteract toxic and septic conditions of the body and its organs rests on exactly the same basis. This the Osteopath carries in his hands the medicine chest, but only as a handle, the materia medica lies within the body itself, in those chemicals, the vital processes and neural activities that are peculiarly intrinsic to the organism and hence entitled to be called internal osteopathic medicine.

Osteopathy has its psychology as well as its physics and physiology. Man as a living unit embodies the chemistry, physics and anatomy of matter, The physiology and the physiological physics and chemistry of motion, and the psychology as well as the physiological and physical psychology of mind. All of these must be taken account of in the mechanism of man. Hippocrates, the reputed father of the medical science, in his De Vita, Book III, writes, "Everything that happens in the body the soul sees with closed eyes." "Diseases are cured by restoration of the disturbed harmony in being and action of the elements, elementary qualities, cardinal fluids and cardinal forces. Nature, that is the vital forces inherent in the body, accomplishes the cure, however, in the best way." Failure to realize the truth of this fundamental conception of the father of medicine opened the way for materialistic medicine and also made it possible for the neglected elements in the true art of healing to be exaggerated by such as emphasize pure and simple spiritualism in the art of healing. This makes it desirable to get at the true ideas that lie at the foundation of the art of healing as applied to man taken in his organic whole.

We have said "life is that science and art of relations, physical, chemical and vital, which gives us certain phenomena that we characterize as manifestations of vitality." In my text book on physiology, page 7, I wrote in 1898, "life consists of the manifestations of certain phenomena, depending upon these three properties \* \* \* the properties or relations of the human body are chemical, physical and vital \* \* \* Life, as far as known to us, exists solely as a manifestation of living matter, the result of underlying causes, these causes manifesting themselves in activities through the human body and mind."

I used the expressive phraseology "science and art of relations" to express, (1) the knowledge (scientia) associated with life, personality means as much; (2) the unity (scientia-summa) here is identity; (3) the practical side (ars), because life after all is living (practicing); hence, as Dr. Pease puts it, expression, or as we intended it, the science (knowledge and unity) converted into the art (expression.)

This gives us as we think the correct idea. Our attempted definition, which was purely tentative, really goes to the very root of the matter, because it takes account of the underlying something, personality and identity, with the expression of the same in the practical manifestations of those relations. Life, therefore, is not absolute, does not spring up aside from a cause, does not exist apart from that cause, and therefore must be relative. Any system of therapeutics which fails to take account of this must of necessity be one-sided.

How can we treat the mind as well as the body? "Intelligent pressure upon his (man's) mechanism, with a proper understanding of his physics, his physiology, and psychology will get results \* \* \* it is not massage or manipulation, it is mastery of the matter and motions of man by trained minds." That is Osteopathy. Man has a subjective and an objective mind and a material body- all correlated and inter-dependent in the complete organism. The subjective mind is man's higher vitality, the body his material organism and the objective mind that nexus of vital activities and processes which binds into unity the subjective mind and the body. Osteopathy can reach all of these through the body directly on mechanical principles, the objective mind through the vital processes that are controlled on mechanico-physiological principles, especially through general sensory and articulatory sensations, and the objective mind by the direct suggestion, verbal, mental or manual, which appeals to the mind on mechanico-psychological principles.

To work out this principle in complete detail brings the osteopathic system to that perfection which it must attain as an all comprehensive therapeutic system. In this it has no affinity either with a purely material system, as the drug therapies, or with a purely spiritual system, as faith healing, because both sides of the therapy must go hand in hand in order to be complete. We will return to this subject later.

If such a conception of the organism as vital and the animating principle of the organism as a vital force is our idea, how, then, do we come to be regarded as a system of mechanical therapists? The structure of the body represents its form. Vitality becomes manifest in the structural form and functional activities. In other words, the body is a vital mechanism. The mechanical abnormalities prevent the normal vital functioning. Hence we look for deviations in the physical form and correct those deviations to gain therapeutic results.

Dr. John Madison Taylor, of Philadelphia, has an article in the Consolidated New York and Philadelphia Medical Journal for December 19, 1903, which requires more than passing attention. The article is entitled, "Remarks on Mechanotherapy, Massage, Bone Setting and Osteopathy." After noticing the wide awake attitude of the people and press of America, he charges home to the lay public "the habit of Applauding only that form of treatment which is distinctly novel and modern and called by them scientific." He seems to forget that people demand results, applying the old maxim "by their fruits shall ye know them." Too often the public have waited with patience for results from old methods, and have been driven to the new, simply by empiricism, following the modus of the doctor himself, of experimenting with something new when the old has failed. This public empiricism has often led to faith in new methods because results followed. Such empiricism on the part of the patient is certainly not blameworthy.

Dr. Taylor then recommends manual therapy as old, practical, reliable and demonstrable, citing numerous cases of instinctive rubbing, pressing, stretching, etc. used as restorative means. He admits that the bonesetters "have accomplished good work to the astonishment and annoyance of educated physicians." He also commends the Ling

system of remedial movements. We are glad to find Dr. Taylor commending manual therapy "for its antiquity and reasonableness," the history of mechanotherapy being "refreshingly clean and reasonable and demonstrably efficacious." The doctor asks why medical skill fails when the skill of the uneducated in medical science so-called, readily applies measures for readjustment, pressure, movement, etc.?

He does not answer this question. The answer is easy. Educated medical science so-called, has a theory of disease and of therapeutics purely medicinal, entirely foreign to the mechanical principles of the organism; and hence when any mechanical theory or principle is applied it is as an adjunct or accessory to the theory of traditional medicine or medication. If the medical doctors could turn the tables and study the organism from the point of view of anatomy and physiology, instead of from the point of view of the effect or effects of drug substances upon the tissue and organs he would have a saner view of healing and a more scientific idea of the organism. "The physiological action of drugs" seems to be a kind of magic wand that stupefies the average doctor so that he cannot get beyond that in his ideas of disease and their cure.

Dr. Taylor accounts for this from the fact that doubting physicians cast discredit upon their own system of medicines and the multitudinous remedies of the modern stock in trade, he thinks, bewilders the public mind so that they become hypnotized under the influences of false ideas. The best he has to say of Christian Science, and by this he means all mental cults, in that it appeals to those touched with mysticism, healing the diseased conscience by a sort of deadening influence upon the diseased state of mind. He does not seem to think that mental states have a place in the unhealthy as well as the healthy field. Presumably the physiological action of drugs would settle the diseased mind.

Dr. Taylor thinks that as the visionary public sceptics have been hypnotised by Christian Science, to the practical public doubtless have been carried away by Osteopathy. His knowledge of Osteopathy may be measured by the statement that Osteopathy is "closely analogous to Christian Science in its non-science and its unblushing claims to do all things well." Yet he admits both contain much that is "wholesome and efficacious", although loaded with "endless falsities". "Medical science has been long fully active to all that is of value in each domain." If so, why does so-called medical science so oppose Osteopathy? Why has not medical science performed the cures ascribed to Osteopathy? Simply because it could not do it. We appreciate the fact that Dr. Taylor values manual methods, having "taught the principles of remedial movements and massage" for over a quarter of a century. Dr. Taylor interprets Osteopathy thus, as found from his skillful search of Osteopathic literature and the literati of Osteopathy. "The Osteopathic doctor lays down as a broad principle, that all, or practically all, bodily derangements are results of disturbances in the adjustment of the bones, whereby nerves and blood vessels are pressed upon or altered in their relationships, and that thereby innervation and circulation, and consequently sensory and nutritive conditions are altered." We are glad the doctor uses the words "adjustment" and "relationship" but to be correct he must not limit these to bones. Adjustments of any por-

tion of the structure of the organism may be altered and this alteration may modify the structural relationship and so change the functional activities of nerve, blood, tissue, organ as to produce disorder, disorganization and even death. It is true as stated, that manipulations are directed, primarily to the correction of the mal-adjustments, and secondarily to the great fields of organic innervation in the centers of the cerebro-spinal and sympathetic nerve supplies. The doctor seems to think the Osteopath is "not well instructed in the significance of the mechanical stimulation of the vasomotor centers and the consequent alteration in the vasomotor not only in the larger circulation but in the lymphatics." We differ from the doctor in this. Of course, he views this from the standpoint of the movement cure idea. We view it differently. Because it lies at the foundation of our view of the etiology of disease. He opines because he thinks we do not study the natural history and pathology of disease; evidently referring to germs and bacteriology because he refers to movements of a tubercular joint. If he will study the views of Osteopathy along these lines he will find that we regard germs, not as causes of disease, but as effects of disintegrating tendencies in the organism. This will explain why we claim that to increase the resisting power of the organism is the only rational and scientific means of treating such a disease as tuberculosis.

We are pleased to find Dr. Taylor recognizing the medical profession are not competent to be critics because of their ignorance of mechanotherapy. "The field of manual therapy is practically boundless". To this Dr. Taylor adds, "It is the prerogative and duty of the educated physician." If he means that the educated physician of other schools claims this field, then we protest. The educated physician of the osteopathic school undoubtedly has a field and as a physician he must be educated. The field is almost boundless in its extent and possibilities. No one unfamiliar with the work can have any idea of the cures accomplished.

The great trouble, as we said before, is that the physician, like Taylor, thinks of supplementing medicines by manual methods, that is, makes Osteopathy a subordinate branch of therapeutics, instead of regarding it as a system, independent of every other system of healing. We are glad that Dr. Taylor has the courage to announce that he has gained cures by these methods which "in the present attitude of the medical profession would probably cause him to be branded as a liar."

There are two great facts, then, which the average medical man must learn:

(1) Osteopathy is not accessory to any system of medication. The fundamental principles of its etiology and pathology are entirely independent of the other schools. No man can teach true Osteopathy as an accessory to medication or as a correlate to the symptomatology, etiology and pathology of the other medical systems. The fundamental principles underlying are based upon the true relation of the cerebro-spinal and sympathetic nervous systems, especially the vasomotor mechanism to the organism as a whole and its parts, both in health and disease.

(2) The Osteopathic system differs from massage and the different forms of movement cures. Dr. Taylor cites two cases of graduates from Copenhagen and Stockholm who stated to him that they



"learned no facts of importance not already known to them". We do not question the veracity of anyone, but state positively that these parties could not have understood either system, otherwise they would not make such a statement. Osteopathy does not pretend to proceed on the same lines, neither does it claim the quality of omniscience. We are familiar with both systems, have studied both systems and, it is needless to say, found great differences between massage and movement cure on the one hand and Osteopathy on the other. We have had patients who have received these kinds of treatment and afterwards received the Osteopathic treatment and have found the results which tell their own tale.

We do not need to say that some take Osteopathic courses and know very little about Osteopathy. There are teachers and teachers of Osteopathy just as in other sciences. It is possible to misinterpret a system, even on the part of close students. We are all familiar with the shambles of science, the account of the work of Dr. Bayliss, who figured in the recent liable libel case in England. The Lord Chief Justice characterized the work as hysterical and yet it passed until challenged as a true picture of facts bearing upon an important experimental field of science. Those who have been educated under a different system, such as massage or remedial movements, try to interpret everything in Osteopathy from the standpoint of their own original education. Hence it is difficult for them to see anything in Osteopathy. Educate an Osteopath in one of the masseur or remedial movement schools and he will interpret these from an Osteopathic standpoint.

Every one familiar with the work of Ling, as interpreted in the book of Kellgren, knows that there is a great difference between the Ling system and Osteopathy. We had the privilege of knowing Hartelius, one of the most devoted and faithful followers of the Ling system. At the present time we have a patient who resided in Hartelius' home and received treatment from him. In this way we have the opportunity of comparing both methods and results. The Ling system is really the foundation of the massage commonly taught and the remedial movements claimed for different independent systems. But there is none of the corrective work of Osteopathy in it.

We are glad that Dr. Taylor sees the importance of the field and recognizes that there is a field larger than massage and exercise, in the mechanical stimulation of the great vital centers, especially of vasomotion, so that in this way we find means "far in advance of all other measures for the relief and cure of a wide variety of derangements, not only of the coarser mechanisms, but of the vital organs". Drugs fail not only frequently, but all the time, because the crude plane of poison can never influence for good the refined plane of vitality. The organism is itself adapted to the prevention of toxic substances from reaching the centers of vitality. It is so adjusted to its own internal mechanism that it will deteriorate within the limits of its physiological capacity. Beyond the limits of this capacity it is susceptible and to push the physiological action of drugs as a theory of therapeutics is to trench upon this susceptibility. To do this weakens, as well as depletes, the organism. For this reason our therapeutics teaches the non-use of drug substances and the use of the resources of nature within the or-

ganism, manipulation being the principle means used to adjust the organism to itself, so that in perfect structural alignment, the natural relationship of all structures to each other may be established as the fundament upon which correct organic life, organ activity and tissue functioning may be built.

We gladly give credit and honor to the friends and promoters of mechanico-therapy in all ages. They laid the foundation for the fuller development in our own time of a fully systematized practice. That practice of today has an unlimited field and its possibilities in the healing of disease no one can limit. As we grasp the significance of its philosophy and apply it from time to time to new fields of disease we are compelled to exclaim "Eureka". We have no quarrel with any other system, nor do we feel any jealousy towards others. Live and let live is our policy. We have the same divine mission and the same divine right to that mission as any other physician of any school. To none do we bow in subordination. To none do we yield the homage that we owe alone to the truth. Hence we place our system in the foreground as a rational, progressive and scientific method of treating human ailments.

Sir William Banks, M. D., F. R. C. S., maintains that in cancer and tuberculous joint conditions a mechanical cause is the prevailing one. In the British Medical Journal for March 10, 1900, he says, "I am not one of those who look for a mechanical cause of cancer in virtually every case, but I venture to say that there is no practising physician surgeon in this country who has much to do with joint disease who does not recognize the immense importance of wrenches blows and aprains in the production of the early inflammatory changes in and about joints, which ultimately end in what is known as articular tuberculous disease." How important then, as he points out, that such conditions should be diagnosed early. If the lesion is mechanical, correct it Osteopathically.

Dr. J. Noir in *Progres Medical*, Jan. 6th, 1900, referring to Hiccough and its treatment, claims that it represents a "series of convulsive seizures due to toxic causes." He reviews the history of its treatment. Hebb applied faradisation to the epigastrium. Others applied galvanization or faradisation direct to the phrenic nerve, while others used a direct galvanic current passed in a transverse direction between the mastoid processes. Leloi applied compression directly to the left phrenic nerve. Nothnagel mechanically elevated the hyoid bone by pressure applied with the fingers. Laborde applied directly traction to the tongue, as Repine applied it in testing for death in the case of apparent death. Noir reports one case of a very nervous female child, 6-1/2 years of age, who after six hours of violent hiccough became so exhausted that she appeared quite dead. He applied traction to the tongue for one minute and a half, restoring the patient and permanently removing the hiccough. Several other cases are reported as cured by the simple method when every other method has failed. Here we have the mechanical principle as applied in Osteopathy.

## THE OSTEOPATHIC POSITION.

Osteopathy differs essentially from all other systems in its account of the etiology of diseases and in the curative principles utilized. From an etiological standpoint, diseases are found to be very often due to structural derangements in the anatomy of the body, whether these are found in osseous, muscular or neural systems. Here Osteopathy claims to have stepped ahead of the rest of the medical profession. Medicine has been very largely occupied in discussing and exploring the field of drug action upon the tissues and organs, forgetful of the fact that the chemicals of life lie hidden in the laboratory of human nature. Osteopathy claims that in substituting the laboratory of the chemist and experimental physiologist, it is getting closer to human nature and applying more scientifically, anatomical, physiological and chemical principles.

We are not trying to undermine the therapeutics of the older schools, but rather, from a humanitarian standpoint, to substitute what we consider a more rational system of healing. From this standpoint, if every tissue of the body anatomically and functionally correct, health must of necessity result. Hence from an osteopathic standpoint, any displacement of any of the tissues of the body may result and, if continued, must result in an abnormal condition. This applies to muscle, bone, ligament, tendon, nerve tissue, etc.

How do these changes in the form of displacement arise? It is easy to understand how a strain, over-exertion, a fall, or any ordinary external or atmospheric change may so affect the tissues as to produce displacement, to cause contraction, strain or dilatation of the structural form of the tissues so as to interfere with the proper flow of the fluids and forces of the organism, thereby producing an abnormal distribution of these fluids and forces. These fluids and forces represent essentially, from a biological standpoint, the vital and vitalizing principles and forces of the organism. It is easy to understand how changes in air, whether moist or hot, drafts, excessive exposure to sun, rain, wind, etc. may modify the muscles and other tissues of the body. In this tissue modification, involving contracture, there is necessarily an interference with the superficial blood supply and tension of the superficial nerve fibers; if this contracture becomes excessive there is a strain on the muscles in their attachments, traction brought to bear on the bones and tendons, with the result that spinal articulation, vertebral and rib connection become abnormal. In this condition there is a decided interference with the muscular and nervous substance, so that nerve force and fluid supply become pathological. The same conditions are found to be produced by the mischances of daily life, a strain, an undue twist of the body, a slip, or fall, or perhaps the attempt to evade such a slip or fall—any of these exerts an influence on the tissues, tending to displace the tissue structures and also interfering with the nerve force and fluid supply to the parts.

Often a vigorous nature and native strength of the body are able to rectify these conditions; but often nature is weak and

cannot of itself restore to the normal. Here Osteopathy steps in to assist nature by so manipulating the body as to correct these wrong conditions.

Osteopathy does not ignore the fact that there are many indirect causes that may be classified under the head of predisposing causes, distinguished from the direct causes of disease or diseased conditions. Heredity, environment, especially from a sanitary and hygienic standpoint, bacilli or multiform variety, infected germs come into play in producing disturbances of function and causing disorder in the tissues of the body locally or generally. Osteopathy claims that often behind these is to be found the real cause of the disease, these secondary conditions simply furnishing the means or medium for the action of a perverted function, and therefore, involving a derangement of the tissue.

When these conditions are found the question arises, how can they be removed? Wherever there is a structural change, a disordered function or derangement of tissue, it would seem natural to suggest the correction of the lesion. The surgeon, when he finds a dislocated joint or a broken bone, uses his mechanical skill in setting the joint and the bone. If a rib is displaced or a vertebra out of its normal position, if a muscle is contracted, involving impingement upon the blood and lymph circulation and on the action of nerve force, why not mechanically use the surgical science in setting right these abnormal conditions? Here lies the secret of Osteopathy—it is the medical-surgical, not the medical and surgical, system.

That these structural disorders affect the internal organs of the body cannot be doubted, from the fact that, osteopathically, the FIRST fundamental principle of therapeutics is, when diagnosis has revealed such a structural lesion, to remove the lesion or correct the misplacement, whether of bone, cartilage, ligament or muscle. Following this, the SECOND principle is, TO ATTEND TO THE GENERAL HEALTH OF THE PATIENT BY SPECIFIC MANIPULATION OF THE BODY TISSUES, SO AS TO PROMOTE FREE CIRCULATION ALONG WITH ATTENDANCE TO CORRECT HYGIENIC AND DIETETIC RULES. When the disorder has been sever removed, then the blood has free circulation and the nerve force free channels for action.

This pressure upon the nerve fiber or blood vessel may occur at any point in the skeletal structure, and the effect may be either direct or reflex; in the former case the effects may be expected near to the point of impingement; in the latter case they will likely be found at a distant part of the body or in distant organs affected reflexly. This is one reason why the spine and the ribs represent in Osteopathy the most important part of the skeleton, because lesions among the vertebrae or ribs affect very seriously those organic structure centers in the spinal cord, the medulla, and the brain at the basis of life; and involve interference with the action of those trophic influences that pass from the spine to the sympathetic ganglia and nerves that surly functional activity to the organs of the thoracic and abdominal regions.

Osteopathy aims to correct rib and vertebral displacement, so that when the tissues and bones are restored to their normal position and function, nature may resume its normal activity. In the removal of these obstructions, irritations and hindrances to free activi-

ty lies the great secret of osteopathic success.

Osteopathy is based on accurate knowledge of the anatomical structure and physiological functions of the body organism. Nature has placed within the body certain vital forces, vitalized fluids, and vitalizing processes and activities which in harmonious accord with one another maintain the equilibrium of the body mechanism; any disturbance of these forces, fluids, or processes, and any interference with their activity, circulation, or distribution, involves the absence of harmony and interference with the body order. Osteopathic manipulations aim to restore these to their normal condition, so that the body may regain its normal functional equilibrium and form. In this way Osteopathy claims that life is revitalized and strengthened by vital forces, vitalizing processes and fluids, disease being removed or overcome by getting rid of an abnormal structural alignment that produces disharmony in the body and prevents normal functional activity.

Technically, Osteopathy represents that branch of the science of medicine, in diagnosis and therapeutics, which is built upon an exact and comprehensive knowledge of the structure of the human body; of its chemical basis and the chemical constitution of its fluids and secretions; of the physical and physiological principles that regulate the body activities; of movement, locomotion, nutrition, vasculature, respiration, muscle, nerve and glandular action— in the elaborate synthesis within the organism of those vital principles at the basis of organic life, so that any deviation from the normal in the form of misplacement, derangement, or incoordination may be easily discovered and scientifically restored by mechanical operation.

HEALTH is the ideal; it starts with the assumption that the body is a perfect mechanism, consisting of many parts, essentially of two that we call body and mind, the active and harmonious operation of all the parts in the perfect mechanism constituting health. This perfect mechanism represents the sum as well as the climax of all being, so that every lower organism or form of existence is subservient to, and in the main contributory to, the upbuilding and development of this masterpiece of nature and God. A healthy body consists of the proper play and correct relation of all the integral parts of the organism, including the correct articulation of the entire skeleton, the proper relations of the muscles, ligaments, cartilages, and tendons to one another and to their skeletal attachments, the exact anatomical structure, and physiological action of the blood vessels and nerves of the body organism, so that all of these, in interdependence upon one another and in correlation to the organism as a whole, form the basis of the vital force of the body.

We hold that there is a trophic influence originating in connection with the cerebro-spinal fluid secreted in the brain, emanating from the brain along the spinal canal and the pathways of all the cranial nerves, to be distributed in every part of the organism peripherally, so that when the trophic influence reaches the different organs and tissues of the body it is capable of selecting appropriate nutrition from the blood, and in sensitive conjunction with vitalized nerve force applying it to the nutrition of the local parts. This cerebro-spinal fluid also exerts a lubricating and anti-

septic influence upon the nerve tissue and the other body tissues in which it is distributed that renders those parts normally immune to disease, and when subject to disease is restorative to the normal.

In the blood-forming and destroying glands of the body we find the basis of a blood formation that is adapted to the body as a whole and its local parts, so that the blood carries with it the nutrient matters and oxygen suitable to every organ and tissue of the body. When the proper nerve force is exerted, this suitable substance is selected and by a secretory process is separated from the blood, to be applied locally to the different tissues of the body. In these trophic, selective, and secretory processes lies the secret of healthy blood, well-nourished tissue, and active metabolism of the tissues, which forms the true basis of a healthy body.

When the muscles of the body are kept in proper tone, when the skeleton and its attachments are kept free from abnormalities, when the cerebro-spinal, cranial, and sympathetic nervous systems are kept in free trophic and nutritive operation, when the supply of blood and lymph throughout the body is preserved in normal equilibrium, then the body is healthy. Any obstruction, interference, or mal-alignment will produce an unhealthy condition of the organism, because of an interruption of the physiological processes or an interference of some kind with the physiological supplies that are necessary to the nutriment of every local part.

The essential basis of any therapeutic effect upon the body, organism, whether produced by drugs, as in the old school of medicine, or by mechanical, thermal, or electrical stimulation, as in the case of the new school of medicine, is that the effect may be produced through a nutritive channel or by nutritive processes. Disease, in other words, involves mal-nutrition (mal-trophicity.) The two main physiological functions controlling the nutritive processes are,

- (1) The nervous supply, and
- (2) The vascular supply.

Both of these must be made the channels of stimulating in order to produce effects upon the organism, otherwise an imperfect result is gained.

Here lies the special value of the newer method of mechanical stimulation over the older method of drug stimulation. Chemical stimulation draws forth energy without supplying a new stock of energy, if the chemical stimulation takes place on an <sup>in</sup>organic basis, that is, by the use of drugs; if it takes place on an organic basis, then the chemical organic substances are food and as such supply the material for the nutritive processes. Stimulation on a mechanical basis has not only a stimulating effect but also a replenishing effect, nerve stimulation and blood stimulating furnishing materials in nutrient matters and nerve force for new energy.

Any manipulative effect to be physiological, must be nutritive in its basis. To accomplish this, there must be the balance of the nerve force, represented either by the cerebro-spinal system or the sympathetic system, and the blood. This may be illustrated in connection with the production of an effect upon the heart. In affecting the heart we can reach its activity through two channels in the two systems:

(1) In the cerebro-spinal system through the pneumogastric, a direct reflex being established with the heart through the inhibitory function of the pneumogastric, and also through the depressor nerve, an indirect result being established through the vaso-motor system in the peripheral parts of the body, in connection with the blood supply. In the former case we have an effect through the continuously acting vagus action, and in the latter case through the emergency function of the depressor nerve, modifying blood pressure so as to relieve the heart when in a condition of strain.

(2) In the sympathetic system through the cervical sympathetic, a direct reflex being established by way of the pneumogastric, and also through the splanchnics, an indirect result being attained through the vaso-motor effect on the peripheral blood supply.

This is simply an illustration of what may be stated of every part of the body, that the nutrition, rhythm, and functional activity are carried on from two standpoints, that of direct nerve force and indirect nerve force through the blood supply, the meeting of these two under normal conditions producing trophicity, tonicity, and functional activity. Both nerve force and blood supply are therefore under the control of manipulative operations of a mechanical nature, and here is the basis of our treatment of diseases operatively. Tonicity, for example, depends upon rhythm, and rhythm depends upon the antagonism of opposing elements or factors in the tissue vitality, such as the cerebro-spinal and sympathetic systems, or the nervous system and the blood, or the two kinds of muscles, as in cardiac tissue substance. The tonic condition of any tissue of the body depends upon these opposing elements meeting in the tissue substance and keeping up the struggle for existence in these tissues of the body. Mechanical therapeutics, therefore, is based upon these physical and physiological principles which are capable of stimulating the vibratory, molecular, electrical and chemical changes that take place in connection with the two main elements of vitalized tissue, the nerve force and the materials of the blood distributed under nerve direction, in connection with the selecting power of the trophic system. The stimulation of these processes can be accomplished most physiologically, without any foreign inorganic substances, by mechanical manipulation.

The body is not only a perfect mechanism; it is also the most wonderful chemical laboratory that exists anywhere in the universe. In this laboratory are generated acids, alkalies, and all the fluids necessary to wash away accumulations of waste or impurity. Every day and every moment of our lives the most wonderful chemical results-analytical and synthetic-are taking place, and these form the basis of those normal changes that keep the body in a condition of order. When these substances thus formed are distributed by the channels of the blood and lymph under the direction of the nerve force to all parts of the body, we have the secret of life. The vital powers of the body are capable of dissolving all the constituent elements of the body from the blood to bone, and the functional action of the body and its parts is capable of modifying nerve, muscle, ligament and bone. If a quantity of blood is thrown out by means of rupture, the result is a tumorous condition, resulting in the temporary suspension of vital activity. Such deposits are capable of being re-

moved by nature. There are such solvents within the body on an acid and alkaline basis capable of disintegrating the most solid formations of the body, osseous or fibrous. In the body chemical laboratory this continual process of compounding, reducing and forming substances of all chemical varieties are going on, capable of dissolving the most solid substances so as to prepare the way for the upbuilding processes.

In this renovation process, the first essential condition is to rectify any misplacement of the osseous, muscular or ligamentous parts of the body that may be interfering with the nerve, blood and lymph activity, not only to give free space and action to the nerves and blood vessels in communicating the elements of life and activity, but also by a free supply of lymph to wash out the impurities, cleansing the congested parts, so as to prepare for the renovation process. If the lymph is thrown into a space where blood has been held in congestion, the blackness of the local part will soon disappear, and by absorption there will be a removal of the substances causing the congestion. Hence, in the manipulation of the bones, muscles, etc. the object is primarily to give free play to the circulating fluids, with the object of dissolving and removing waste matters, if such are present; secondarily, to furnish a free supply of those substances that are borne upon and in the fluids, especially of an albuminous nature, that are necessary for the renewal of depleted or degenerated parts.

In addition to this, the scientific manipulations are designed, even where no marked abnormal condition of bone, muscle or ligament is noticeable, to throw in the chemical supplies of the body life where they are demanded, so that nature may be assisted in the renovation by being furnished with such substances as are necessary in these processes.

The Osteopathic theory is essentially based on the idea that this process is twofold, and that it takes place naturally without any foreign drug medication; (1) The stimulation of the production or compounding of the substances that are needed by the body or by its parts; and (2) The manipulation of the parts of the body in such a way that these substances thus prepared by nature may be brought to the parts demanding them most, so as to remove all hindrances to health, and supply all that is necessary to normal vitality.

For example, when we find renal or bladder disorders there is usually found clinically some tenderness in the renal area around the spine. This leads to an exploration of this area to find out any abnormal variations, involving disturbance or displacement in the renal nerves, or else something in the spinal articulation involving pressure or interference with the trophicity of the organs. It is universally recognized that the lesions in cases of ataxia are not caused by a primary manrosis of of the neuroglia, the degeneration beginning in the prolongations of the posterior nerve roots in the spinal cord. According to the commonly accepted theory, the degeneration is due to the cutting off of the nutritive action of the posterior ganglion by some pressure on the nerves fibers at the point of entrance into the spinal cord. Under normal conditions these fibers are constricted at this point of entrance and it is easy to see how an obstruction like a meningeal thickening and induration, involving



vascularity and nutrition at this local point, would result in the degeneration of the intra-spinal fibers. Manipulation in this case would be designed to remove the local pressure and restore the nutritive continuity of the nerve fibers in the spinal cord.

What is true of one small part of the body may be true of the body as a whole, all the different parts of the body being united in the most sympathetic relations. Every organ and every part of the body seems to be at least sub-conscious that it forms a part of the mighty whole. If any part should fail, it is the law of animal life that all parts suffer together, because from the great brain source of conscious and sub-conscious power to the minutest nerve filaments in the most distant part of the body there is an inseparable relation of structure, function and vital activity, forming the mainspring of life. Man cannot be perfect in health if the minutest nerve fiber to an eyelid is subjected to an irritation. The same law holds good of every part of the body. Hence whenever and wherever these minutest variations from the normal are found, there is disease its true and etiological substantial etiology; and here is found a fertile source of mal-nutrition, irritation and degeneration that produces so many of the symptoms of a pathological condition.

On this basis, the Osteopathic diagnosis is reduced to the discovery, or attempted discovery, of the cause, or causes, of disease. Diagnostic conditions may be summarized under three heads; (1) Misplacements of bone, cartilage, ligament, muscle, membrane or organs of the body; (2) Disturbances in the fluids of the organism, including the blood, the lymph and other secretions of the body; (3) Disorders or derangements by tension, impingement, thickening, induration, etc. of the nervous system, including its centers, ganglia, plexuses, and fibers. Following up this line of physiological thought the Osteopathic therapeutics is simplified and will consist in the correction or the removal of the cause or causes of disease.

Corresponding with the diagnostic points, we find (1) scientific manipulations that aim to correct misplacements in the body and other tissue structures of the body, in its membranes or organs; (2) scientific manipulations that are designed to rectify the disturbances in the circulation of the body fluids and to restore them to their normal condition, especially blood conditions and defects in the blood circulation and distribution; and (3) scientific manipulations that utilize the nervous system with its fibers, ganglia and centers, with the view of correcting the nervous disorders, toning up the general system or its local parts, promoting trophic conditions of the nerves and muscles, and stimulating a normal correlation of the psychic and physiological and vegetative functions of the human system.

We must diagnose exactly the condition. When such is done, then we correct everything abnormal or irregular, so as to allow freedom of action of the tissue structures, fluids, forces, etc. The manipulation work sets free the body and its parts so that life can manifest itself through the body.

The entire body is for functional activity; hence there is nothing waste or superfluous and no room in the body for any abnormal condition. Hence the slightest deviation from the normal structure involves some interference with organic action and may give rise to

untold mischief in the neural or muscular systems. Theoretically, Osteopathy has for its ideal a body whose bone framework is perfectly fitted and delicately set, whose muscles are carefully attached in their origin and insertion, whose blood is freely circulated in every part of every organ and tissue and whose nerve force is the assimilating and life-giving principle in the entire body. There is a physiological sympathy between all the different parts of the body, and this sympathy is based upon nerve force. The laws of neural energy furnish the principles on which this uninterrupted sympathy may be preserved and at the same time they explain all possible deviations from the health standard. In harmony with these laws, order must be restored to the system.

The basic principle is that if the body organism is in perfect health, every body tissue and structure performs its part without interruption, the body structure representing the framework upon which the other tissues of the body are built and to which they are attached. Hence the bone framework is used in establishing landmarks for physical examination and as a means of restoring misplaced parts of the body. The bones become the basis for operative manipulation, so that manipulation represents the medium of the therapeutic operation in removing pressure, in producing stimulation and inhibition in connection with the nerves and their centers.

One of its fundamental principles is that for the body, whether in health or sickness, no extraneous medication is necessary, outside of that natural dieting suggested by experience as essential for the sustenance, as well as the repair, of existing tissues, and for the creation of new tissue in connection with the general disintegration and dissolution of the body bioplasm. Dietetics represents the essential nutritive basis of a healthy and vigorous system. Good food in sufficient quantity, not to excess, and sufficiently varied, together with muscular exercise and normal respiration, represent the true culinary and gymnastic theories.

The muscles represent about 42 percent of the body substance. The metabolism in this is about 50 per cent of body metabolism. Oxygen represents about 64 percent of the constituent substance of the body. Hence muscular exercise representing free mobility and deep breathing, to supply the oxygen, are very important.

The essential principles of Osteopathy may be set down thus: (1) Health is natural; disease and death between the time of birth and old age are unnatural. (2) All bodily disorders are the result of mechanical obstruction to free circulation of the vital fluids and forces and the continuity of nerve force. (3) The impediments in the way of free fluid circulation and uninterrupted nerve force are found in osseous misplacements, contracted muscles, ruptured ligaments, constricted or dilated vessels, hypertrophied tissue substance, or congested conditions of the tissues. (4) These abnormal conditions represent, not only the change in structure or function on the part of particular portions of the organism, but also produce physiological disorganization of the vital forces of the body, producing an irritable condition either of over stimulation, under-stimulation or inhibition, resulting in excessive activity, partial activity, or inactivity of the vital forces and processes. (5) In the restoration to the normal, the main purpose in operative manipulation is

to co-ordinate the vital forces, to restore harmony in the vital functions and thus aid nature in the elimination and checking of diseased conditions. Indagnosis based upon accurate knowledge of the structure and functions and activities of the tissues and organs of the body, the condition of disturbance is traced to its primary cause, through or by the aid of symptoms and secondary conditions. In the organic regional areas of the spinal cord, in the regional plexuses and sympathetic ganglia, secondary organic centers are localized in dependence upon the great primary centers of vitality and vital force in the brain, the manipulation aiming at and reaching those centers of organic activity, trophic action, and regional control that are affected by the disharmony of function, the modification of structure, and the disorganization of the vital forces, to restore them to normal activity.

Osteopathic manipulation has passed beyond the experimental stage. It is now a demonstrated system of healing. It gains results because it uses and aids nature. All nature is pregnant with force, and nature's force is the most remedial because it is natural. The powers of the body are all self restorative to such an extent that what is necessary is, not massage or drug medication or any kind of artificial treatment, but simply the utilization of what lies hidden in the laboratory of life. In this way and on this basis, assimilation is possible without alienation, so that remedial measures can be adopted that are native to the organism, with the subtle force of vitality and without any of the harmful properties of foreign substances. The underlying factor is that of body order and physics developed in connection with animal mechanics in the field of physiological physics.

Orthopaedic Surgery and Orthopraxy have emphasized the mechanical principle in the treatment of deformities, debilities, and deficiencies of the human body. Massage has also emphasized the mechanical method of general rubbing and kneading. Osteopathy attempts to specialize the mechanical principle in dealing with all kinds of curable diseases, acute as well as chronic, graduating pressure, tension, vibration and all the mechanical forms of physical stimulation in their application to muscles, bones, blood vessels, nerves and organs of the body so as to gain therapeutic effects. This is the technique of osteopathy.

For example, Spinal irregularities involving curvatures or separations of the vertebrae throw out of line the vertebral spinous processes and produce impingement upon the nerves as they emerge from the spinal cord. In removing these irregularities mechanically by manipulation, the nerve force is liberated from pressure, and thus the suffering part of the body supplied by these nerves is relieved by relieving the osseous irregularity. The anatomical order of the body is also dependent upon the osseous framework, so that in the adjustment of the framework the body tension producing body pain is relieved; and this relief is brought to the system by using the bones as mechanical appliances, to remove tension and to produce the stimulation necessary to the stimulation or inhibition of the nerve centers.

Osteopathy repudiates drugs as foreign to the organism. The attempt to furnish an inorganic substance is regarded, not only

as unnecessary, but as actually harmful to the organism. This arises from the fact that nature has provided a well-stored laboratory within the organism itself, consisting of processes, forces, functions, structural and physiological relations, as well as organic chemical compounds, which are sufficient to meet all probably causes of disease. For example, in chlorotic anaemia it is a well recognized fact that the disease is not produced by an under supply of iron, but from physiological inability to utilize the amount of iron stored in the liver and thrown off in the form of waste matter. Osler says, "Iron is present in the *ae*feces of chlorotic patients before they are placed upon any treatment, so that the disease does not result from any deficiency of available iron in the food." To remedy this condition the administration of inorganic iron is not only superfluous but injurious, because it will increase the amount of waste thrown off through the excretory system and therefore increase the excretory function to an excessive degree. Bunge claims that sulphur prevents the assimilation of this organic iron found in the food, the sulphides produced by fermentation retarding the assimilation. The administration of inorganic iron is said to promote a combination of the sulphides with this iron so as to permit the normal organic iron to combine with the haemoglobin substance. This is imply a theory, and it lacks demonstration. Clinical experience has demonstrated that the correct way to remedy the condition in which the iron is not used by the system but thrown off as waste, is to remedy the defective nutritive condition. This can be done, not by increasing the amount of inorganic iron, but by promoting those physiological processes that are necessary to blood formation in connection with the assimilation of iron in organic form to the newly formed or combined haemoglobin of the red blood corpuscles thereby preventing the iron that is accumulating in the system from being wasted.

In the case of febrile conditions, in connection with the vaso-motor system and the temperature nervous system of centers and nerves, it is possible to reduce the febrile temperature and keep it within bounds, use being made of the nerve force and the blood supply through vaso-motion. More particularly through the vaso-motor system it is possible to keep up the circulation of fresh and nutritious blood so as to check the ravages of the micro-organic germs, to such an extent as to produce phagocytosis by stimulating the white blood corpuscles to activity in the destruction of the micro-organisms that are rendered lethargic by the febrile temperature and the free supply of fresh blood, or by the production of chemical compounds that destroy the germs. This renders necessary the injection of serum on the basis of modern serum-therapy, because, by the manipulation of the blood and lymph in connection with the nervous system in the individual affected, the leucocytes can be stimulated to such activity as to eat up the germs and thereby produce in the system a serum that will render the body immune from the action of these disease germs.

In pulmonary affections it may be demonstrated that tuberculosis is a disease at least associated with the nervous system, the normal trophic influences being cut off in some way from the pulmonary system, so that the pulmonary system becomes a prey to the devastating action of the germs of tuberculosis. Hence the contracted thoracic

conditions are often associated with phthisis, or the vagus interference found in connection with the vertebral displacements, or pressure upon the vagus in the upper thoracic region. The lungs represent the seat of many forms of pulmonary diseases that have wrought havoc among humanity. The condition may be one of simply congestion, of bronchial inflammation, or of pneumonic infiltration of the pulmonary substance. All these inflammatory conditions are caused by an interference with the blood flow, dependent on contracted conditions of the muscles of the thorax, the displacement of ribs, or the induration of the spinal muscles in the thoracic region of the spine, producing excessive stimulation or inhibition of the pulmonary nerves. These mechanical causes interfere with normal respiratory actions, preventing the inspiration of a sufficient amount of pure oxygen and the expiration of the necessary amount of carbon dioxide, as well as cutting off the trophic influence from the pulmonary tissue. To remove the causes, manipulation of the thoracic and spinal muscles is resorted to in order to remove the contracture; the rib depression is rectified; inhibition is brought to bear upon the spinal nerves that branch out from the spinal cord along the upper half of the dorsal region, to regulate the vaso-motor action and stimulate pneumogastric action in connection with lung trophicity.

Headache almost invariably involves a pressure upon the cranial nerves a displaced atlas or axis, or vertebral displacement of some kind in the upper cervical region of the cord, producing pressure. Asthmatic troubles are usually found in connection with contracted and confined thoracic conditions, interfering with the action and supply of the nervous system to the lungs, and thereby preventing the normal respiratory action, which requires the action of muscles and nerves and the thoracic enlargements of the chest produced by the raising, expansion, and rotation of the ribs and the rib attachments, together with the diaphragm.

Drug therapeutics bases its MATERIA MEDICA on pathology, symptomatology, and pharmacology in their relation to chemistry, physics and physiology. The application of pharmacology is essentially empirical and alien to the body system. Osteopathic therapeutics bases its MATERIA MEDICA upon the chemical, physical and vital or physiological functional principles of the normal body organism, in comparison with the abnormal functional action of the same principles from a pathological standpoint; so that while health represents normal functional action, disease represents abnormal functional action, of the organism or its cells. Hence while drug therapy uses internally or externally inorganic remedies, osteopathic therapy represents applied functional biology and physiology and applied anatomy, on the basis of applied mechanical physics and chemistry.

Osteopathy claims a prophylactic as well as a curative value. If osteopathy is correct physiologically, and everything depends on physiological demonstration, then the osteopathic practitioner should be in the best sense a family physician. His place in society is to attend to the family so that in the nurture of children the skeletal structure and the physiological function of the organs of the body may be corrected at every mischance and kept in a correct condition. A child may be born with a misplaced anatomical structure or perverted physiological functions. In childbirth these misplace-

ments may be produced, and if a child is to survive the operation of birth or to live a happy life in the future, these must be attended to in childhood. These childhood conditions account for much of the unhappiness and misery of later years, and give rise to many of the diseases that end in death before adulthood is reached.

Osteopathy lays it down as a necessary principle that health is natural, disease and death unnatural between childhood and senility. To demonstrate this, the osteopath asks a field and a fair and even chance to show that this contention is correct physiologically. He asks the privilege of applying, subject to the law, the principles of physiological medicine. He is not a Christian scientist and has nothing akin to the mind healer. He believes in mind as the dominant factor in life, mind representing the master element in connection with the body organism; but he does not believe that in mind healing can be found a panacea for all the ills that afflict humanity. The diseases that affect the body are no ghosts with phantom-like appearance. That they are too real to require a demonstration is evident from the fact that osteopathic symptomatology is based entirely upon structural and physiological malalignment. Even in the case of mental diseases we find that they are associated with the same, or similar, anatomical and physiological mal-adjustments, displacements, or hypertrophic conditions, so that even insanity is subject to correction when these abnormal conditions are removed.

Physiology explains and largely accounts for psychological conditions, for true psychology is founded on physiology? The mental states and activities are of value only as they are illustrations and manifestations of physiological relations and conditions. The psychic conditions of life are brought out in the study and diagnosis of mental diseases and in many of the nervous diseases. The physiology of the brain, the spinal cord, and the entire nervous system, is at the foundation of every true theory of life, whether we take it as physical life, in its preservation, prolongation, and its treatment under diseased conditions; or in regard to mental life, normal or abnormal, or even the higher moral and spiritual life. If physiology is taught in all its bearings, it gives us the functions of a differentiated human life consisting of a number of organs, all of which are independent and yet united together to form in unison and harmonious activity a single life. As we step into the higher field of psycho-physiology, we find that mind is the ascendant power, and that in a healthy physiological life nothing less than a healthy mind can secure that vigorous condition of body necessary to health and happiness.

While we treat what seem to be purely bodily diseases, we must remember that the field of mental diseases is also opened up, and that these mental conditions of unhealth must be removed before the cure of the body disease is possible. It is probably that every active operation of the nervous system affects the whole human organism, so that there must be a constant activity on the part of the nerve cells, accompanied by continued impulses entering and leaving those cells. This forms the basis of the continuity of conscious experience. Thus to each man is given by birth, not only a body, but also a mind, the basis of mental character and development. When man starts out from this initial point, his development is determined largely by environmental conditions and educative processes. Even the power of voli-

tion is increased by culture, so that the inhibitory influence depends largely on educative influences. These educative influences pass through the nervous system, especially in connection with the education of the central nervous system.

Mental development, therefore, for good or ill, for health or disease or mind, depends on those educative influences under the control of physiological nerve tissue. Here lies the basis of osteopathic work in mental diseases. The same causes, or at least analogous causes, that produce bodily diseases, may produce mental diseases by involving an interference with the neural mechanism that is the essential physiological basis of mind and mental activity.

While thought and mental actions cannot be spoken of as secretions, as Cabanis claimed, thought is impossible and mental activity an absurdity apart from those nervous processes which have their basis in the chemical, physiological, and vital changes taking place in the nerve cells. Here lies the secret of osteopathic treatment by manipulation in the case of mental diseases, the manipulation being directed to the establishment of stability in the trophic conditions, adjusting the normal relations of cell with cell, preserving the integrity and unity of the nervous system, and correcting any misplacements or mal-adjustments of bone, muscle, etc., that would interfere with neural irritability or conductivity, the blood circulation, and other nutritive conditions necessary to neural integrity and continuity. By removing those abnormal processes and conditions that affect the nervous system, the nervous system is set free as the medium for the manifestation of mental activity, and thus sanity may take the place of insanity.

The principle of auto-suggestion is not the principle of Osteopathy, although it may undoubtedly be utilized with purely mental conditions. Scientific suggestive therapy is undoubtedly a part of Osteopathy, as it is of every rational system. But Osteopathy recognizes body diseases as well as mental diseases, and it deals with these body diseases from a body or material standpoint. Osteopathic therapy is, therefore, material as well as psychic. Auto-suggestion has nothing to do with the therapy of body diseases, because osteopathic treatment can be applied even where there is mental resistance. The materia medica is purely physiologic and therefore material, without any relation to spiritualism or Christian science in any form. In my own laboratory I have demonstrated that in cardiac conditions of failure or over-activity it is not necessary to give a drug either to stimulate or lessen the heart action; for, by the use of the sphygmograph, either the radial or carotid, or the cardiograph, along with the recording kymograph, we have shown that the moment the fingers are placed upon the pneumogastric nerves the action of the heart is accelerated, and the moment that manipulation is applied to the superior cervical region controlling the sympathetic ganglia and the nerves in connection with the heart, the action of the heart is lessened. Tracings of some of these experiments have been preserved in the case of both normal and pathological heart.

The inhibitory effect of the vagus on the heart, according to Stefani, is to protect the heart against possible exhaustion due to dyspnoea, increase of arterial pressure, and increase of temperature.

When the arterial pressure increases, the cardiac center is stimulated, both directly through the vagus and indirectly through the depressor nerve. By the stimulation of the cardiac center, the inhibitory action is increased with the result that the increased blood pressure is reduced. In the dyspnoeic condition, the blood depletes the muscles with the result that the depleted blood stimulates the cardio-inhibitory center, reducing the heart beat, and this enables the heart to get along with a lessened amount of oxygen. By the increase of temperature the cardio-inhibitory center is stimulated, inhibiting the cardiac innervation, thus regulating the heart so as to enable it to resist the increased temperature. In this way the inhibiting innervation of the heart forms one of the vital factors in the heart life, furnishing trophicity to the heart, increasing the cardiac diastole and increasing the anabolic over the katabolic processes. This explains why manipulation in connection with the vagus nerves has such an important modifying influence over the heart.

Diarrhoea and constipation have both been controlled and corrected by the manipulation of the nerves from the spinal cord regulating the secretory and peristaltic processes of the intestines. There seems to be an economy of nature in the capacity of the different nerves for stimulation. For example: The dilator fibers are more easily stimulated than the constrictor fibers in the vaso-motor system, the constrictors being the constantly active and the dilators the emergency fibers, the former representing the tendency to normalization in connection with the blood supply. Diarrhoea is produced by some mechanical irritation or obstruction, as for example, the contracted condition of the spinal muscles resulting in an irritable condition of the vaso-motor splanchnics to the visceral organs. The result is that the mucous lining of the intestines become congested or inflammatory, associated with accelerated peristaltic action. The exciting cause from a physiological standpoint is the increased excitability of the vaso-motor nerves passing out of the spinal cord along the lower dorsal region. To remove this condition, an inhibitory pressure is brought to bear upon the lower dorsal region along the spine, so as to modify and normalize the peristalsis of the intestines and to regulate the blood supply, thus establishing nutritive order.

The curative standpoint of Osteopathy is nature's means of health. Health is associated with the harmonious action of all the different parts of the system, when these parts are free from irritation or disturbance from any cause, so that all the fluids, forces and substances essential to life are permitted to flow freely to every part of the body, uninterrupted by any stoppage, impingement, dislocation or displacement of any kind. The great law of life is harmony. Disharmony involves disease and leads to death. To remove this disharmony the Osteopath attempts to trace out and readjust the mechanical disorders that impede some of the normal functions, thereby enabling nature to return to her equilibrium and to give health to the patient. Most, if not all, diseases have a direct relation to some mechanical cause, and the only cure for such a primary lesion is the mechanical correction of it.

When the condition is complicated, as in many diseases, by the presence of micro-organisms germs, we accept of the theory of Huelpe, in opposition of the Koch school, that specific diseases are



not caused by specific germs. Disease represents a function, not of the germ, but of the animal that is diseased, the normal activity of the organic cells giving health and the abnormal activity giving disease. According to this, disease is the result of abnormal functional activity, resulting from (1) certain external conditions, and (2) internal body conditions including the presence of the bacteria. Among the internal conditions we include the abnormalities already referred to which result in a mal-nutritional condition of certain organs of the body, this mal-nutritional condition furnishing the field for the bacterial deposit, development and feeding in the tissues.

When there is an obstruction to the free fluid circulation and the free nerve current, there is presented a culture field for these germs which begin to multiply and also to throw off toxic substances? Osteopathic therapeutics attempts to relieve the mechanical obstruction so as to prevent the germs from enjoying a field of culture, and when cut off from this culture medium, throw in a rich supply of fresh blood whose leucocytes become active in the destruction of the disease germs. Fresh blood, fresh lymph, and fresh cerebro spinal fluid represent three antiseptics furnished by nature for the use of the operator in dealing with micro-organisms, as well as forming a nutritive basis in restoring normal local nutrition.

All inflammatory conditions represent primarily congestive conditions dependent on obstruction either of the arterial or venous circulation. The removal of the congestion involves the removal of the mechanical cause of the obstruction to the circulation.

From a diagnostic standpoint Osteopathy aims to develop a new science of diagnosis, in addition to the older methods of diagnosis by palpation, auscultation and percussion. This involves the idea of a refined and sensitive tactition. A complete knowledge of human anatomy, both normal and morbid, includes a knowledge of the system from the standpoint of educated touch, so that the proper discrimination may be made between the normal and abnormal. The fingers can certainly be delicately educated to such an extent that in the blind there may be almost the vicarious substitution of touch for vision. The basis of this highly refined tactile education is found in the physiological structure and specialized activity of the minute nerve fibers and neuro-muscular organs in the fingers. At the basis of all the senses lies the essential principle of sensibility, so that in the education of the senses this sensibility may be acutely specialized.

From the standpoint of objective diagnosis, this educated tactile sensibility represents a new and most important diagnostic means. It represents the materializing principle of osteopathic diagnosis, distinguished from the subjective diagnostic principle of symptomatology. Symptoms are always more or less exaggerated. A physical examination by far excels any subjective statement of the case, as facts become the scientific basis of a true diagnosis. Part of the course in osteopathic education is the training in this method of diagnosis by purely physical examination, so that the practitioner may be able to trace out on the normal body the outline of all the organs, the vertebral relations, skeletal articulations, etc.

In the spinal cord there are localized subsidiary organic centers, centers of reflex action, and subordinate centers, corresponding with the brain primary centers, so that in nervous disorders and diseases of a nervous origin or complication, the operator can reach those centers of vital activity in connection with the vital forces, by manipulation along the spine. The object is to manipulate the nerve center and the nerve fiber, as well as to correct any existing lesion, so that by physiological stimulation or inhibition neural harmony, neural trophicity, and neural continuity of impulse may be established.

THE PHYSIOLOGICAL BASIS OF THE THERAPEUTIC LAW  
OF THE OSTEOPATHIC SYSTEM.

Introduction-- Greek Idea.

The history of medicine has been one continued medley of therapeutic changes. In Homeric Greek days professional medicine and surgery were represented by Machaon, whose special attention was devoted to healing injuries, and Podalirius, who had the hereditary gift of "recognizing what was not visible to the eye and tending what could not be healed." In the Asclepiad era moral and dietetic measures were adopted without the use of drugs, the first records of cases being made on the walls of the temples. This was, however, entirely distinct from the more primitive form of medicine. The Greek conception of the physician embodied itself in the Hippocratic ideal in which we find

- (1) A profound conception of the sanctity of the profession and its claims for honesty, sincerity and morality;
- (2) Great skill in the discharge of professional duties;
- (3) The disease in the patient represents a process governed by internal laws equally with life and health, according to which there was a natural history of disease developed in the so-called symptoms of disease of clinical medicine; †
- (4) The dominating theory of disease was that of the humors, blood, phlegm, yellow and black bile, being supposed in health to be in proper proportion, whereas in disease these were irregularly distributed or in improper proportion;
- (5) Consequent upon this theory of disease was the theory of cure, depending (a) primarily upon the curative power of nature, (b) certain natural processes through which the humors pass, especially in acute diseases, marking the progress of disease towards resolution, crisis and recovery in connection with the expulsion of the excess through the channels of secretion. (c) Diet was of first importance, medicines in the sense of drugs being used of secondary importance, (d) in the chronic diseases diet and proper exercises being of the greatest importance.

THE ROMAN ERA.

Roman medicine was a development of early Greek medicine

and as personified in Galen we find the temperaments based on the Hippocratic humors, the normal temperaments depending on the proper proportion and distribution of heat, cold and moisture and dry, the abnormal in improper proportion and distribution of these. The way in which medicines were introduced by Galen was as follows:

The Galenic therapeutics recognized by experiment and observation, that certain drug substances of the same elementary qualities as the temperaments and therefore he used these substances to correct the improper distribution of elemental qualities in disease, cure taking place on the principle contraria contrariis. Galen's influence held full sway in autocratic medicine until the 18th century.

In the 16th century Paracelsus formulated the principle that the body is a microcosm corresponding with the macrocosm of nature, nature being sufficient for the cure of most diseases, are being required only when the man himself becomes exhausted or insufficient, and therefore the use of physicians is to supplement nature on the principle of supplying a like in which nature is deficient.

#### THE STARTING POINT OF THE MODERN IDEAS.

The 17th century gave birth for the first time to distinctive systems founded upon the discoveries and development of physiology. Borelli, of Naples, sought to explain the functional activities of the body on physical and mechanical principles, movements of bones and muscles being explained on the theory of leverage, digestion being a trituration process, nutrition, secretion and excretion depending upon pressure and tension in the vessels, implying that in therapeutics the same physical and mechanical principles must be applied to the supply of deficiencies in the organism in disease. Traditional medicine dismisses the contributions of the iatro-physical school as belonging to physiological history as if physiology were outside the realm of healing. About the same time the English Sydenham claimed that disease represents the effort of nature to restore health to the patient by the elimination of morbid products from the system. The iatro-physical school, under the influence of the Newtonian principles of physics in the laws of nature, developed in Britain under Piteairn and Cheyne, who attempted to explain life and disease on mechanical principles. Friend applied the same principles to the phenomena of menstruation. Richard Mead and James Keill applied the mechanical principles to the explanation of the body functions. These are the precursors of the new pathology, etiology and therapeutics of disease.

The fundamental principles of physiology may be laid down in this way:

(1) The body consists of different kinds of matter, this matter being arranged in tissue form- the basis of tissue being the cell and of the cell- bioplasm.

(2) These tissues have (i) similarity in origin from a common bioplasm, and (ii) dissimilarity in their molecular composition, manifested in different microscopic structure and dissimilar

forms of activity. These two points are the basis of anatomical and molecular integrity.

(3) These tissues differing in structure and in mode of activity are variously arranged in mechanical adaptation and adjustment to form organs by means of which the different activities of the organism are given special attention. This organ arrangement ranges all the way from the mechanism of the central nervous system, in which the mechanical structure consists of minute cells and fibers in which the molecular factor predominates, to those, the large and crude organs, as in respiration and circulation in which the mechanical factor predominates.

(4) Hence the physiology of the organism must take account of, (1) the processes that take place in the microscopic tissue constituents, the cells. These processes are chemical, physical or chemico-physical and represent molecular activities; (2) the processes that result from the tissue activities, these activities being modified and controlled by the mechanical adaptation of the particular tissues; (3) the fact that all these processes are intimately related to and independent upon the VITALITY which animates the organism as a whole, its constituent elements and organs. Hence all the physiological processes must take place from one or more of three standpoints— the MOLECULAR, MECHANICAL and VITAL points of view, that is, these three characteristics are associated with every part of the organism and all its functions.

All functional processes in the organism take place in connection with the great tissues, which are the nervous and muscular tissues, all the rest of the body acting simply as an aid and a protection to the muscular and nervous systems, or as a complex machinery to supply these master parts of the organism with food and oxygen through the medium of the blood, to clear away the waste from the tissues and to keep up the normal temperature of the different tissues, and thus prepare the body and its parts for normal activities.

In these processes the blood is the agent and medium; the body may be regarded as a complex mechanism for the transformation of food and oxygen into blood, removing the waste from the system and maintaining the normal body temperature. The blood function, then, is the primary function of the organism and it is performed in connection with bioplasmic cells whose processes are partly molecular, partly mechanical and partly vital. Secondary to the great blood function we have a distributive function of the nervous system and an intelligent function, which is that of direction also associated with the nervous system, but always subsidiary to the blood function. According to this, deficiencies or defects in the organism must be classified as molecular, mechanical or vital.

Therefore the physiology of the body must inquire into:

(1) the principles and laws that regulate the transformation of food into body substance and regulate the katabolism of the body substance into waste products; (2) the laws and principles that regulate the origin and distribution of nerve vibrations, their relation to muscular contraction, the secretory processes and the different forms of tissue activity; (3) the laws and principles which regulate the generation of nerve vibrations in connection with the

MOLECULAR, MECHANICAL and VITAL processes of the tissue cells, the relation of the chemistry of energy to the vitality of energy and, finally, the relation of vital energy to movement, rhythmic mobility, feeling, thought. These are the fundamental physiological principles that underlie therapeutic action and therapeutic law.

Historically the change from the normal in the body has been interpreted by symptoms or signs. The pathology of objective disease has, however, emphasized the change in the structural constituents, the cells, pathology depending on (1) The perversion of the physiological processes; (2) changes in the chemico-physiological constituents of the elements and (3) changes in the structural constituents, namely, the cells. But normal function depends upon the normal chemico-physiological constituents, the vital adjustment of which means the freedom of the life forces and a state of orderly health. The cells and tissues form the living body and these sustain physical, chemical and vital relations within the organism, the processes of nutrition in connection with the cycle of metabolism representing the foundation of the continued organic life. The fundamental principle is the cell condition, whence in the cell modifying the metabolic cycle.

### T H E R A P E U T I C S .

To meet this, empiric medicine used substances to modify the chemical reaction and scientific medicine uses the exact analytical and synthetic principles of chemistry to combat these changes. How? (a) To control the organic processes of the cell life, not by producing changes, but by (b) regulating the responsive activities of the cells in their metabolic changes, so as to restore the equilibrium of cell life.

Physiology suggests two principles, (1) the correction of maladjustment, the removal of obstructions and the co-ordination of the life forces, fluids and processes of obstructions by the removal of every abnormality to perfect adjustment; this means the correct machinery; (2) eliciting a response from irritable tissues and mobile cells, whether on the basis of acceleration or retardation. The nervous system is an automatic mechanism and the most important parts perhaps of it from the point of view of co-ordinating the streams of nerve vibrations that penetrate the entire organism are the dendritic branches by means of which a process of switching is carried out in the distribution of the physiological impulses to the different organs and functions. These dendrites have even the power of insurrection or boycott, breaking the circuit of impulses in such a way as to interrupt co-operating relations between organs. It is this that interferes with the community of cells frequently when no distinctive lesion is found in the structural machinery, and lowers the vitality beyond the point of elevation to normal.

## THE PRINCIPLE OF THERAPEUTICS.

There is a law, or principle, of therapeutics. Can we discover it? According to Dr. A. T. Still, "a disturbed artery marked to an hour and a minute when disease began to sow its seeds of destruction in the human body. That in no case could it be done without a broken or suspended current of arterial blood, which was by nature intended to supply and nourish all sinews, ligaments, muscles, skin, bones and the artery itself. He who wished to successfully solve the problems of disease or deformities of any kind in all cases, without exception, would find one or more obstructions in some artery or some of its branches."

What does this mean? The law of therapeutics then from the osteopathic side is, that the obstructed circulation (a) results in the disturbed balance of trophicity, and (b) consequently throws some tissues or organs into a state of mal-assimilation (c) the result of which is that we find diseases of organs and tissues, tumors, cancers, etc. According to this the unobstructed arterial blood is at the foundation of health, every part of the body depending on this blood for nutrition. Here, however, we meet with a cycle. All life and life forms vibrate and pulsate in cycles. (a) The arterial blood builds up and develops to function the nervous system, (b) but the nervous system furnishes stimulus, and even nutrition, to the artery in order that it may pulsate in harmony with the master tissue of the body in the supply of food to the entire organism, that is, artery and nervous tissue may unite with the blood in supplying the needs of the organism. Thus in the cycle of health, arterial control and nervous direction stand pre-eminent; therefore the law of cure must be that of uninterrupted arterial blood supply and unimpeded nerve control. What co-ordinates and unites these together? It is probably that we can never solve the why and wherefor of our present being, or tell just exactly how the organism assumed its present form and functioning. Out of a vitalized cell the organism is evolved in its entirety, all evolution being determined from within. Hence the cycle of primary cell life must be resolved into (a) that of nucleus (bioplasm), (b) cell substance (protoplasm), (c) limited by the enveloping cell wall. The bioplasm is and contains the life force, determines towards itself from without all nutritive substances, vitalizing these substances, so as to form a basis for new nuclei for the karyokinetic process of development. When this process has gone on to maturity, the life principle embodied in principle determines certain combinations of cells in the formation of tissues and organs, the whole being bound together as an organism, maintaining an independent life and forming a unity. Vitality, then, from the physiological side, is represented by the nucleus, and the basis of the nucleus is nucleoproteid.

### THE VITAL ORGANS-- HEART AND BRAIN.

In this organic unity, heart and brain seem to be in a social sense vital organs- the brain is the great generator of force and fluid and heat, using as its accessories in this work all the organs of the body; while the heart, under the stimulus of the

brain, which is a mass of neuron cells, rhythmically distributes the fluids, with all nutritive and medical substances, to the remotest parts of the organism. These functions are reciprocal, form the corresponding or parallel sides of a cyclical progress; mutually help and stimulate each other to the great task of preserving and perpetuating in the individual or his progeny this organic existence.

#### TRUE THEORY OF CIRCULATION.

After centuries of physiological vagaries concerning the circulation, Harvey discovered that the blood can flow only towards the heart and when flowing away from the heart is in the direction of backward toward the heart again. For a long time it has been practically taught in the physiologies that the arterial blood flow is caused primarily by the heart contraction, the systolic influence causing it to move out and onward through the vessels. But experiment has shown the force of the heart to be insufficient to drive the blood through the tuftlet system of capillaries. Attempts to inject the capillaries have demonstrated that a force sufficient to drive blood through the capillaries,

- (1) Must be greater than the heart force, and
- (2) If such a force were existent it would increase the pressure to such an extent as to produce capillary rupture, such as takes place in apoplexy. Hence, the key to systemic circulation does not lie in the heart. Where, then, is the key?

Comparative physiology indicates the true theory.

(a) The systemic circulation of the fishes is carried on without any heart, except as a reservoir, beginning and terminating in capillary systems without any central organ. Remember we were all fishes in embryology.

(b) Similarly the portal circulation in the human subject begins in a capillary system of vessels in connection with the veins in the digestive apparatus. These unite in the common trunk of the portal vein, which sends its ramifications through the liver substance, the portal blood passing into the capillaries of the hepatic veins, which empty into the inferior vena cava.

(c) Embryologically, the nervous systems make their appearance before the framework of the vascular system. This gives the nervous system priority over the vascular system. This vascular system, when formed, forming a network of vessels through the body, and is actively and fully developed before any heart makes its appearance. The heart, in fact, is not completed till after birth. In some forms of monstrosity the circulation of the blood takes place without any heart, and in others without the separation of the two sides of the heart.

(d) In the vegetable kingdom the circulation of the blood, or sap, begins in a minute capillary system in the roots, terminating in a minute capillary system in the leaves, and vice versa. Here capillary force with endosmosis and exosmosis are sufficient, to send the sap frequently hundreds of feet, overcoming gravity with considerable ease.

### CAUSES OF CIRCULATION.

What is the cause, then, of the circulation? The circulation of the blood differs from sap circulation in plants only in one particular, viz: because of the structure of the blood vessel walls in the animal kingdom. Between the outer layer of areolar tissue and the inner membrane walls lies the coat of muscular tissue. This means that the force of circulation in the human and animal kingdom is greater than and different from the sap circulation in the vegetable kingdom. There circulation through the arteries, therefore, depends upon the peristaltic contraction of these arterial wall coats of muscle. These muscle walls act as a series of plates, sensitive and motile, so that the pulsation of the arterial system represents the pulsating currents of vitality via the peristaltic contraction of the arteries.

Hence, our conclusion is that the capillaries are not the terminals of the circulatory system, but the beginning of it. The heart is the terminal, just as it is the last part of the circulatory system to be developed. Hence, the heart is subject to and dependent on the circulatory phenomena of the capillaries. The capillaries represent ramifications in the structure of every organ and tissue of the body. In these ramifications the great fundamental work of nature is carried on, including heat generation, the vital activities, body repair and renewal and the vitalizing processes in the different tissues. Here in the circulatory system the pulsating rhythm of vitality takes origin, the heart being a general center, or reservoir, within the continuous structure of the circulatory apparatus where the activities are co-ordinated, influences combined and made to co-operate. Hence the heart is not a force pump but a general co-operating center in connection with which the general vitality and life forces concentrate for distribution throughout the entire vascular and tissue system, and a reservoir for the general reception and distribution of the blood.

That means that the heart acts as a general center in connection with which the life processes, especially of vasulation are co-ordinated and made to act together. Where are the life processes center? In the muscle.

The neural impulses which produce this harmonious contractile action of the entire vascular system originate from the cerebrospinal and the sympathetic systems, all the different parts of the vascular system being supplied by fibrils from these two nervous systems. These fibers are arcued in connection with the nerve center activity, the center activity depending especially for stimulation upon the oxygen taken into the system in respiratory activity, upon the food furnished to the nerve tissue as a result of digestive, metabolic and secretory activities in the respective organs, and especially upon thought, emotion and will when in active operation from the psychic side of life.

The heart, then, does not act as the great pumping force in the circulation. It does not even regulate this action of the circulation. It is simply a general reservoir and distributor, which unites the various parts of the vascular system, co-ordinates their activities, the real stimulus of the circulation depending



upon the peristaltic action of the minute blood vessel system, called the peripheral system, and this peristaltic action depends for regulation on the nervous system under "the guidance of vitality". The peripheral circulation thus becomes THE KEY TO THE CIRCULATORY FUNCTION, or THE BLOOD FUNCTION:

(1) This explains the arterial wave of peristaltic action in relation to the circulatory phenomena.

(2) This explains the failure of success in the use of cardiac stimulants and depressants.

(3) It indicates the only rational method of reaching the circulation and even the heart, namely, by the action upon the peripheral blood system, and especially through what is called the vaso-motor nervous system. This accounts for the success of osteopathic procedures when these are directed to the vaso-motor mechanism.

#### THEORY OF THERAPEUTICS.

The theory of our therapeutics depends on, (1) the vital force, which represents the sum of all vital activities and processes in the body organism, the cosmic energy in man, the energy of understanding and will; and (2) on nutrition and assimilation, the tissues and organs depending for their vitality and vital activity upon nutritive conditions. Both of these are controlled from the adaxial cerebro-spinal field of brain and spinal cord. The brain centers represent the higher life, and the different paths from the brain to the body along the nervous system are pathways of distribution in connection with vital force and nutrition. In this we must take account of brain nutrition, in connection with which we get

(1) The production of the cerebro-spinal fluid as a secretion, and

(2) The generation of nerve energy that passes outside of the brain in the form of waves of vibration.

#### BRAIN NUTRITION AND INFLUENCE.

The nutrition of the brain depends on definite changes in the brain, these being regulated by certain movements in which the lymph and blood play a most important part. In the case of other body organs, like the liver, these organs receive in all their parts an equal supply of blood when normal. It is different in the brain, because all parts of the brain are never acting simultaneously. Therefore the brain is nourished and gets its circulation in sections. Hence, the difference in function forms the basis of the difference in blood supply to the different parts of the brain. The demand regulates the supply. In the brain the supply regulates the demand. The skull is an immobile structure and it limits the capacity of the cerebral blood supply. All pathology of brain diseases is of this order:

(1) The brain substance does not entirely fill up the cranium, (2) lymphatic channels and reservoirs being within the brain, that is, lymph is a balancing substance, in order to (3) to form a yielding base for the brain, not a solid structure like the cranial roof. In this yielding substance we find certain rhythmical movements. The brain acts on the body and controls the body, but the

body reacts on the brain. We find brain movements corresponding (a) with systole and diastole of the heart, (b) with inspiratory and expiratory changes, and (c) with the vascular variations of vasomotion. All brain movements and blood pressure in the brain depend upon these three forces; therefore the number and variety of headaches. Therefore the variations in the blood supply to the brain depend upon (a) anatomical structure and (b) physiological movements. Brain activity represented by these brain movements regulates blood distribution and brain nutrition. These movements are peristaltic, and when brought into relation to the mechanical motor power generated by the cranium give rise to the blood, lymphatic and cerebro-spinal fluid circulation. According to this (a) The brain is nourished in connection with its blood supply, and (b) at the same time metabolic changes give rise to lymph and cerebro-spinal fluid found in the subarachnoid spaces and in the ventricles, (c) and cause them to pass out of the cranium, passing down into the spinal canal, thence along the path of all the spinal nerves, and also along the cranial nerves.

Hence, the brain exerts a three-fold influence over the body,

(1) NUTRITIVE, through the influence it exerts upon the vaso-motor system, in virtue of which it selects the food materials from the blood that circulates through all the tissues and organs;

(2) TROPHIC, direct from the cerebro-spinal system, by the cerebro-spinal fluid, which passes out along the paths of the cranial and spinal nerves. This makes all tissues and organs trophic. If this is not normal, then the tissues or organs are in a state of mal-nutrition and liable to all sorts of diseases. These nutritive and trophic conditions are controlled by the neuron cells of the brain. Tissues that are non-trophic may grow by accumulating substance, but do not develop by assimilation. TISSUES MAY BE NOURISHED AND NOT TROPHIC. Normal tissues are trophic when they are under the trophic control of the cerebro-spinal system. When they are in this condition they are immune from disease. When in a non-trophic they are susceptible to disease; (3

(3) The brain generates impulses that pass out to all parts of the organism through the nervous system to give origin to maintain the trophic, tonic, rhythmic, peristaltic and vibratile condition of tissues and organs. That is, this mobility and contractility or elasticity, which is the characteristic more or less of every tissue and organ is produced and maintained by the perpetual stream of vibratile impulses from the brain towards every part of the body. Here we get the vibratility of the vital force.

#### PHYSIOLOGICAL AXIOMS.

1. The first pages of physiology bring out into prominence the VITAL FORCE as that which lies behind the matter of the structure and the material functional of the body organism.

2. The basic principle that runs all the way through physiology is ORDER, harmony and co-ordination, these being established by and through the nervous economy. The field of co-ordination is the nervous system.

THE FIELD OF CO-ORDINATION VS. THE NERVOUS SYSTEM.

3. There can be no organo-disease or organo-therapy, because no organ of the body stands isolated and alone, the sympathetic relation of the nervous system making it imperative that the body be regulated as a commonwealth of cells, and omitting all other tissues of the body.

4. The great media of therapeutic action is the cerebro-spinal and sympathetic systems, these systems being co-ordinated, each system contributing an independent functioning to the united nerve mechanism. The former contributes control, especially in connection with its trophic function, exerted over all parts of the organism through sympathetic channels. The latter, vago-motorily, regulates the blood supply and therefore the nutritive condition of the cerebro-spinal system. Any weakening of these united and co-ordinated nerve mechanisms renders therapeutic action less certain and may render it impossible.

5. The fundamental theory of physiological life is that of co-ordination, co-operation and adjustment. From the starting point of the embryological life we have the adaptation of the male and female elements in fertilization, the gradual progressive evolution of embryonic layers and cells, embryonic tissues and organs, until in the co-adapted organism we find the structural and functional adjustment of all the parts of the organism at the basis of vital manifestation. The structural framework is functioned in relation to the rhythmic activities of soft tissues and these in turn are regulated by the co-ordinate activities of four distinct motive powers, representing four definite planes of vital manifestation: (1) the reflex, (2) the automatic, (3) the voluntary, and (4) the volitional center activities.

6. The vitality of the nerve tissue, and its degree of vitality, is the basic fact in the physiology of the organism and this manifests itself upon these four planes of activity in connection with all the organs and organic expressions of life. The co-ordination of these within the physically and physiologically conditioned material body constitutes what we know of actual life, the expression of the deeper life principle and the life force. These four planes are:

(1) PHYSICAL. There are certain forces, - sound, light, heat, electricity, etc. The physical basis of all these is vibration. Vibration is an accepted fact in science. Solid bodies are composed of atoms which are vibrating at almost infinite velocities. One substance differs from another mainly in the modulus of vibratibility, the different planes of substance representing the planes of gradually increasing vibratibility. The higher vibratibility governs and moulds the lower, just as the sun centralizes the solar system. The most refined vibrations that mean life and light, with all their accompaniments to the planets, in that solar system. Hence, in man this vibratile characteristic also predominates, for within his organism he combines the higher and lower grades of vibratibility in connection with mind, brain, bone, muscles, blood. So long as these combined vibratilities are in harmony the organism enjoys life and health; if broken they result in unhealth or death.

(2) THE VITAL PLANE. In man there is a vital force, so-called because there is no better term. It is not the vital principle, or the soul, or the subjective mind. It is the vital force, or that force which originates and remains in the body as the result of the union of spirit or simple substance and matter. It is the objective mind of the psychologist.

In this sense the vital force is a physical force. It differs, however, from the purely physical force in this: The principle of this vital force is the POWER OF FLUXION or OF VIBRATION, which, as in the physical forces, can permeate the substance without affecting or modifying its substance. There are thus three planes, the pure MATERIAL, the pure SPIRIT or psychic, and the plane which originates in connection with the union of these other two, the VITAL FORCE plane. What is the plane of therapeutics? What is the plane of dietetics?

(3) THE DIETETIC PLANE. The plane of dietetics is that of pure matter, the food taken into the body passing through a metabolic cycle, terminating either in being assimilated to the material tissues or else in elimination as unassimilated or unassimilable. Here we are dealing with crude substances, subject to the metabolic laws which regulate the repair of waste and the renewal of tissue, and the metabolic laws that regulate this cycle are two-fold:

(a) supply regulates the demand throughout the body, and

(b) demand regulates the supply throughout the brain tissues, on a nitrogenous basis.

This makes it imperative to supply food substances in proximate principle or crude substance form, and this means the antidoting or hunger and thirst by the appropriate CONTRARIA substance, that will fill the void and satisfy the material craving and appetite.

.....(4) THE THERAPEUTIC PLANE. In the therapeutic plane, therefore, we are dealing with

(a) the nexus of spirit and body, and, therefore,

(b) with those vibrations or fluxions that lie at the

foundation of the force called vital, and

(c) with these foundations at the foundation of physical

force, the organic life meets and combats from time to time. On this plane, therefore, crude materials or forces cannot be of any service, because they are foreign to the force to be affected, namely, the vital force, and as such cannot enter the field of vital force.

.....Here we have a plane of adjustment going on all the time within the organism. In this organism spirit and matter are united to form a unit life and this life in meeting other lives, forces and substances must adjust itself to, or be adjusted to these other lives, forces and substances. This is the so-called struggle for existence.

Hence, we conclude that the crude substances of drugs and diet are both out of place when the vital force is making its struggle for existence in any field of disease. In the crude drug substance (a) there is nothing refining, but everything is crude

and material body substance, and <sup>as</sup> it is not the body material that we are curing, <sup>and</sup> it is the vital force in its relation to the body we are adjusting, we cannot accomplish the adjustment by a material substance, there must be a refinement compatible with the force to be affected. (b) This means that increased vibratibility is the principle of adjustment, from the vital force side.

There are, it is true, the cruder forms of the changes in the body, (1) the metabolic cycle, representing hunger, thirst, etc. These demand the crude changing. Why? Because the body has organs in which certain changing, refining and forming goes on; secretions are the nutritive supplies of the higher forms of tissue. Therefore they are important. (2) The vital cycle depends upon vibration. Waves of vibration pass along the tissues, especially from the nerves and the brain to and along the muscle tissues. There is no function of the body that does not have peristaltic or rhythmic vibrations. How are we going to affect those? By affecting vibration in the substance used, or in the treatment given.

#### VIBRATILITY IN CONNECTION WITH LIFE.

The time may come when we can measure the vital force by measuring its vibratibility. We must approximate to this normal vibratibility. There can be no life manifestation, except in relation to vibration. As the vibratibility becomes less intensive man becomes less capable of reactive power, mental and physical decline follow. Some call it magnetism, electricity, life or vital potentializations. Is there anything to lead to determine potentialization. Sympathetic life or visceral life is cruder and represents a lower plane of vibratibility, although higher in the scale of rhythmic pulsation. The cerebro-spinal is more refined and represents a higher plane of vibratibility, although more inhibitory in its nature. Therefore the higher vibratilities appeal to the cerebro-spinal system. As most, if not all, functional activities represent co-ordinated sympathetic and cerebro-spinal activity, the medium vibratibility represents the normal, changes depending on the capacity to react.

In regard to the toxic conditions, a toxic condition represents a maladjustment and this may exist on two planes:

(a) In the metabolic plane. Here the irritating substance is a material substance. It belongs, therefore, to the physical force plane and must be dealt with accordingly.

(b) In the bioplasmic, or vital force plane. Here there is no material substance, but the influences imparted to the bioplasm are toxic and these are of the nature of disturbing vibratibility. For example, aconite; crude campher. In converting into therapeutic

- (1) Metabolic toxic substance is met by a toxic substance
- (2) Bioplasmic toxic condition is met by a force.

### GUIDING PRINCIPLES.

(1) The principle of determination is from last to first, symptoms disappearing in the reverse order of their appearance. Why? The last to disappear is the least entrenched in the system.

(2) The pathway of least resistance is the pathway of curative effects.

(3) There is a normal degree of vibratile force in the organism. A certain portion may be over-active or under-active.

This explains what seems to be organic disease. The curative principle is the economic distribution of these vital vibrations on the principle of adjustment, such as is compatible with life. Disease causes a re-distribution of this adjustment, and in cure the vital force is directed to the orderly adjustment of the economy of vitality.

### VALUE OF SYMPTOMS.

SYMPTOMS are the voices of the patient, or the vital force of the patient, expressing the internal condition through the outer or superficial plane of manifestation. At first we find in the organism a life force and it is constantly struggling against death forces or disease causes during the life of the individual. These disease forces are accentuated by unhealthy environment. The vibratile life force of the patient resists these. This vibratile life force represents the inherent rhythmic vitality of every organ and tissue. Everything superficial represents the expressions of the physiological life through or from under the pathological, demanding aid for the physiological life, to help perpetuate and keep up the struggle for existence and to determine it in favor of vitality. These expressions may be (a) subjective, what the patient feels, reports; (b) objective what the physician sees on the surface of the body or brings out by manipulations of the body or its parts, in any form of deviation from the normal.

### THE LAW OF CURE.

To meet these the law of cure is that of adjustment, co-ordination, co-operation. All life represents force and the nature of this force is rhythmic or vibratile, because the disorder is mal-adjustment, the two possible conditions being above or below par or normal, and vibratility or motility can only be changed by something of its own nature. Hence the value of correcting the arterial wave and the nerve impulse.

### THERAPEUTICS IS PHYSIOLOGICAL.

Is healing physiological or pathological? The allopath says he prescribed on pathological symptoms; the homeopath says he does not prescribe physiologically, but prescribes on the basis of the totality of symptoms in an abnormal subject, that is, he also prescribes pathologically. Both of these are wrong. It is undoubt-

edly physiological. So long as life persists there is a tendency to the normal in the organism. This is represented by the reactive vital force of the organism. To this reactive vital force, that is, the physiological capacity of the organism to return to normal and to respond to means of bringing it back to normal, we must appeal. Here there is much of the confusion in the science and art of healing. It is not to the pathological state or condition we appeal, but to the physiological, to restore order and remove the pathological. Therefore all healing must be physiological in its nature.

Are there any indications of this curative principle in physiology? It is this that lies at the basis of all mechanical systems of healing, the setting up of increase in or the checking of the vibratile impulses, the correction in the distribution of the normal vibrations sent out from the brain center of control and distributed by co-ordination from the different planes of center activity.

#### ITS THREE-FOLD BASIS.

The curative work of any therapeutic system, if it is true, lies here. Curative action to be physiological is three-fold in basis:

- (a) Corrective, establishing disturbed adjustment;
- (b) Stimulating, increasing the local or regional distribution of vital forces, and
- (c) Inhibiting or checking and decreasing the local or regional distribution of the vital impulses.

What does nature do? NATURE DOES ALL THE CURING THAT TAKES PLACE; all that we can do is to help nature along the lines of the ~~weakness~~ weakest parts, forces, or functions. The question is What can nature do? Answer:

(a) Every atom has a certain affinity for every other atom in the molecule. We call it chemical affinity, or molecular force.

(b) The law of gravitation has a centripetal and a centrifugal force, that is, drawing forces; and these forces, whether chemical or physical, have their homologue in the field of biology. The simplest living substance has an internal force which keeps all its particles determined to the organism.

(c) Plants and animals grow in fixed forms, the form being definite, different from the formlessness of the inanimate. Here cohesion is a determining principle. This is energy or force of a formative type and it is derived from the formative intelligence of the animal organism. This keeps all parts of the animate animal body- from the simple amoeba up to the man- in order, and this animating force or order, is the determining factor in functionings.

(d) On the basis of this energy or force, or animating principle, the great governing principle of the animal is adaptation. Dead substance cannot adapt itself to environment, that is, this vital, operating and adapting force, which represents the LIFE PRINCIPLE or constructive soul, keeps the body continuously constructed and

reconstructed on a definite and orderly plan of adaptation. This is nature, and this definite orderly plan is carried out by the executive officer of the organism, the vital force, in connection with the vital impulses sent from its center to every part of the body.

#### CYCLES AT FOUNDATION OF THERAPEUTICS.

Here we have the foundation for those cycles, (a) the psychic cycle of the will, understanding and emotions, representing the volitional voluntary and sensitive life of man; (b) the metabolic cycle of anabolism, katabolism and rest, representing the vegetative life of functional activity and development; (c) the reproductive and regenerative cycle, in which certain organs are concerned in preserving and removing the life from destruction, first, of the individual, and secondly, of the race, under the vital force, in connection with certain glandular activities, and the third, distinctive phase of life, in which the principle is "dying to live"; for example, the thyroid glands, suprarenal capsules, pineal glands, and the sexual reproductive organs glands. The most profound physiological principle illustrated in these glandular processes is change of dead, dying or waste substance to the same character of living substance in order to assimilation, refining and double refining the substance to reach the central bioplasmic life substance. Here chemical activity gives place to biological activity. Poisons within the limits of the organism are detoxinated. If the system is overborne by poisons it cannot detoxinate. Then biological vitality gives place to chemical activity and the organism is in danger of dissolution and the separation of the different planes of vital activity from the central force of the organism takes place. In this case an antidote is demanded on the chemical plane, in order to prevent the central life and its forces from being overwhelmed by the toxic action of the poison. This means that poisons can have no therapeutic action in the organism, but simply an antidotal or katabolic action.

#### THE ORGANISM, A UNITY.

One of the central facts of the physiology is, that the organism acts as a unity, and yet consists of a mass of unit cells. These cells all act in unison and harmony whatever takes place in health. Hence, if the body is diseased there must be a changed cycle; not the absence of cycle, or of the elements of the cycle. The cycle of disease

- (1) Lack of adjustment.
- (2) Reaction of this lack of adjustment upon the vital force in the form of disturbance, obstruction or impediment to normal activity, and
- (3) This reaction upon the vital force weakens certain functional activities and results in consequent tissue changes brought out in the field of morbid anatomy.



### THE INTERNAL SECRETIONS OF THE ORGANISM.

The greatest doctrine of modern physiology is that of internal secretions. These internal secretions represent the most perfect and refined metabolic products of the body. The cerebro-spinal fluid is a secretion of the brain representing the most highly vitalized fluid in the body; the thyroid secretion and the suprarenal secretion represent respectively, the stimulation to the vaso-dilator function of the cerebro-spinal nervous system and the constrictor function of the sympathetic system. These secretions represent the refining processes taking place in the glandular fields of the body. The meaning of these secretions we take to be, that a refining process goes on in certain glandular structures of the organism to prepare the most highly nutritive and vital fluids of the body, and on these depend the trophicity of the organism.

### PHYSICAL AND CHEMICAL VIEW.

This is sufficient answer to modern physiologists who claim that physical and chemical processes fully explain the life of man. Even in some of the newer fields man is spoken of as a machine and all his activities are regarded as purely mechanical. Pure bioplasm is structureless, at least as far as the minute examination microscopically of it can show. It is free from granules, the broadest and most essential difference between bioplasm and non-living matter being that bioplasm has a remarkable capacity for movement. In fact mobility is the primary characteristic of bioplasm. Every form of living matter has mobility. This is not all. "Every nutritive act, every form of increase and multiplication, each kind of growth, the production of buds or offsets, the development, the formation and increase of every tissue, involves active movement of the particles of which living matter is composed."

### VITAL MOVEMENT WAVELIKE.

This movement in some forms of living matter is microscopic, but no living matter can exist apart from some movement; This we can put in the broadest proposition that vital movements are essential to life. When these movements cease life ceases. The Primary movements that affect every part of a mass of bioplasm are undulatory or wavelike, producing continual changes in the mass of bioplasm. In the development of the constituent elements of a mass of bioplasm, there is a movement from the center to the circumference, the nuclei and the nucleoli forming new centers of development internally to the bioplasm, these being vital centers growing out of centers of bioplasm already existing. As the constituent particles of bioplasm move from center to circumference, the fluid containing the nutrient matter, or the non-living matter, flows from the circumference to the center. As it reaches the center it becomes vitalized and then is determined the movement from center to circumference and so on ad infinitum while life lasts. In the movements of

one part of a mass of living matter in relation to the rest of the living matter, the movement is peripheral, the first movement being along the line of least resistance. Hence, in life the movement is from the centers of life towards the peripheral or superficial parts of the cells, tissues, or organism.

Dr. Gideon Wells writes, "all metabolism may be considered as a continuous attempt at establishment of equilibrium by enzymes, perpetuated by prevention of attainment of actual equilibrium through destruction of some of the participating substances by oxidation or other chemical processes, or by removal from the body or entrance into it of materials which over-balance one side of the equation."

#### TISSUE MOVEMENTS ESSENTIAL TO LIFE.

In connection with the formation of tissue the amoeboid or locomotive bioplasmic movement is noticeable. This is especially true of the nerve tissue, although it is equally true of muscle and probably of all tissues. The most essential movements in the tissue when developed are,

(a) The movement of living matter from center to circumference, and as a result of this,

(b) The movement of nutrient, non-living matter from circumference to center.

These are essential to life and life cannot exist and be perpetuated without these. The other movements are more or less accessory to these fundamental movements.

#### HOW THIS MOVEMENT TAKES PLACE.

In explaining these bioplasmic movements from the centers of life, it is essential to remember that the primary constituent of bioplasm is water, the solid being held in solution in the fluid. In the most minute particle of bioplasm there is a center of vitality. To this center nutrient matter comes from the circumference to be vitalized and to enter the cycle of perpetual movement from center to circumference. New matter is formed in these vital centers, this matter previously non-living coming into contact with the living and acquiring its vital characteristics. There is no power of non-living matter at all comparable to this. A complex process goes on,

(a) Bioplasm through the cell selects the nutrient matter from the blood

(b) The blood in turn is tissue and as such is formed by bioplasmic processes

(c) All the blood elements are in reality, the white blood cells or their disintegrated products.

(d) The vital action in all cases is at some center of bioplasmic mobility. Hence vitality acts in bioplasmic centers only upon matter that approximates to these vital centers, preparatory to being itself vitalized.

(e) This center of life receives its illustration embryo-

logically in connection with the nucleus of the fecundated ovum, the primary origin of vitality in the newly formed organism, the original center of all organic being the nucleus of the ovum. Without this center of life and mobility the new organism would be impossible. Hence, the vital actions and all the phenomena of life are simply physical and mechanical expressive of the original vitality, are limited to already existing bioplasm, and this already existing bioplasm in the centers of life renders possible the physical and mechanical phenomena, which we call change of matter. According to this the bioplasm thus possesses a vital force which it can project into the non-living, drawing it closer to its center life and then projecting it outward towards the circumference as the basis of tissue and of tissue and organ formation. Whatever the fundamental bioplasm in the fertilized ovum may be, as it divides and subdivides in drawing within and projecting out from its own centers of vitality, non-living matter, which it causes to pass through formative changes, there still remains somewhere a great center of this vital activity and mobility.

#### DEVELOPMENT OF TISSUES.

In man the tissues constituting the organism are definitely formed before the nerve tissue is developed or begins to act, nerve tissue being the last to reach full development. How then does this development take place? The bioplasm of the nuclei of the embryo represents the formative force at the center of the substance of the nucleus. This divides and subdivides, forming bioplasts that possess inherent vitality, taking in food and pressing it out to the circumference, until fully formed tissues are developed, the bioplasm being associated with the nerve tissue last developed and fully developed. This determines what can and what cannot be assimilated or used by the organism. Whatever falls under the head of food can be used, therefore the centers of vitality can take the food and vitalize and then project it to the different parts of the body for assimilation. Here lies the secret of that medicinal action based on food and oxygen and the principle of adjustment, which appeals to the centers of the vital force, because only in this way can the circumference of vital matter be reached.

#### DISEASE DEVELOPMENT.

This is equally true of disease. If the bioplasm increases too quickly, its developing power is impaired; resultant tissues are soft and feeble in functioning, because the period of formation has been too short to allow of maturing. On the other hand, if bioplasmic activity is too great there is no tissue development at all. This means that nutrient matter is too quickly rushed through the centers of vitality to permit of the vitalizing process. Here we have what takes place in the inflammatory processes, an increased nutrition of the bioplasm of tissue or of the organism as a whole in the febrile states.

Bioplasm lives very slowly, takes on nutritive matter and slowly projects it with vitalized power into the circumference of tissue or of the organism. In inflammatory conditions the bioplasm grows, becomes static, no new matter being formed to be projected outwards, with a probability of permanent damage being done to the bioplasm, preventing future new formation. This explains why destroyed organs or tissues cannot be reformed, because the formed or structural tissues and organs are developed from structureless bioplasmic atoms.

Connective and epithelial tissues are most liable to such rapid increase as is found in inflammation, but any tissue may thus pass into pathological motivity. And from every form of bioplasmic tissue, but especially connective and epithelial, pus corpuscles may be found or formed, these being the degenerated or degraded normal bioplasm corpuscles. Here development takes place pathologically, because all bioplasm tends to grow. This means that the bioplasm is ultimately the field of origin of all diseased conditions.

#### THE BIOPASMIC ORIGIN OF DISEASE CONDITIONS.

Now in these cases bioplasm is overfed, producing resultant soft tissues, the bioplasm living too fast. Another point is the active agent in disease conditions is the degenerated bioplasm or its particles. The pus corpuscles in connection with septic diseases and the bacteria in contagious and infectious diseases, and the toxins of the toxic types, arise from the degenerated bioplasm. These so-called materies morbi are not the causes of disease, but are themselves the products of changes in the vital centers and the accumulation of the nutrient elements which favor the growth of the germ as soon as the disturbance of bioplasm exists. Probably in all cases vital action goes too fast, the vital center rushing through itself the nutritive matter with an increased vital activity, with the results, too much heat, too much fluid, and too much nutrition, conditions that favor those inflammatory, purulent and febrile conditions which present the culture conditions of bacterial development, namely heat, fluid and food. The primary starting point, therefore, in the disease condition is the deranged, disorganized or obstructed vital activity. This, take notice, is in the bioplasmic field. Secondly, this primary condition reacts upon the metabolic field or cycle, causing the rush of nutritive elements from circumference to center, with the abnormal products in the bioplasm becoming degenerated products, representing degeneration; thirdly, the pus corpuscles and bacteria are developed and propagated rapidly in this favorable medium, thus created by disorganization, both of the vital centers and the metabolic field. This explains (1) the seemingly spontaneous and spasmodic cases of infection in contagious diseases. (2) susceptibility in certain individuals to contract disease.

#### NERVE TISSUE IN HEALTH AND DISEASE.

In the highest form of tissue in the body, nerve tissue, we find all of these principles illustrated. Behind the simplest

nervous action there lies a nerve current and this can be set free in connection with chemical change. Before such chemical changes take place the material must be formed in connection with the central bioplasm. The current that passes along the nerve fiber is generated in the cell and in its nature it is analagous to electricity. These currents are undoubtedly associated with nutritive acts, these being governed by nerve force. The minute nerve filaments to the capillary blood vessels represent an automatic nerve apparatus connected with blood distribution. If the nutritive process becomes too active, these fibers in the capillaries communicate with the trophic nerve centers in the spinal cord (anterior horns), resulting in the transmission of efferent impulses to the circular muscle fibers of the arterial walls. This diminishes the caliber of the blood vessel and checks the flow of blood to the capillaries, diminishing the amount of nutrition allowed to pass to the tissues. The same nerve apparatus restores nutritive harmony, equalizes the blood supply and balances the nerve forces. In this way the supply of nutrition, the regulation of temperature and the balance of nutrition and temperature are preserved-- all in connection with the arterial wave action.

All these nerve fibers and centers were gradually prepared for functional activity by a formative process in the bioplasm and only as bioplasmic vitality is preserved will the mechanical, functioning of this nerve apparatus continue. The nerve force arises from the changes that take place in these bioplasmic centers. These centers are very closely associated with the sensitive peripheral terminators, especially in connection with the special senses and the terminal expansion of the motor fibers in muscles and other end organs of motivity.

The nervous system is (a) the field of origin of all bioplasm, (b) the field of distribution of the bioplasm, (c) the field of selective and assimilative processes in the development of tissue, therefore, the periphery of the nervous system is the great field of distribution, selection and assimilation, and we are justified, I think, in concluding that the bioplasts at the periphery of the nerves, both superficial and central, perform an important part in the development and regulation of the organism. In doing this they have a three-fold function:

(a) In the formation, preservation and renovation of the complete neural apparatus;

(b) In the development of the nerve wavelike currents of sufficient intensity to act as stimuli to the nerve centers, these nerve centers with their bioplasm being the great centers of neural impulse generation;

(c) The same bioplasm is concerned in the thermogenic (heat) function (body temperature), especially when an unbalance of the nerve economy exists. In this state of nerve unbalance heat is then generated by the nervous system, instead of nerve impulses, or rather the heat is not converted into nerve force or energy. This last will explain the relation of the nervous system to the development of temperature and febrile states, whether physiological or pathological, for example, in febrile states.



tissue in rhythmic relation to the organism. The vibratile adjustment takes place on the scale of the existing mal-adjustment; (h) When dissolution takes place on the general vital activities gradually, from without in, let go the material previously constructed under their formative action; if this dissolution is checked before it terminates in death, the reverse order must be followed in the reaction of the vital force, upon the material parts of the organism. Hence the ab ultima ad primam principle is the principle or law followed out in the rejuvenescence or restoration of the organism.

These are the basic physical, chemical and biological principles at the foundation of the system of therapeutics.

#### THE BALANCE WHEEL OF LIFE.

(i) In the preservation of the organism it is well to remember that the great balance wheel of vitality is around the spine, the spinal cord and the spinal column representing the mediating influences between brain and body. In the brain the peristaltic variations are regulated by the vaso-motor influences that center in the dorsal spine. In the systemic circulation stasis or equilibrium between the two blood circulating streams is also prevented by vaso-motor activity. Hence the key to the continuous blood circulation is found in the vaso-motor field. Probably everywhere in the body the vaso-motor system holds the balance, acts as the moderating influence or represents the regulative action. This is in line with the idea of the body life as a cycle, complete in itself. Self preservation consists in the due and proper balance of the different cycles in the organism, each organ having its own cycle, we have already referred to.

#### THE INTERNAL SECRETIONS- OSTEOPATHIC MEDICINE.

(j) The foundation of nutrition is internal secretion. Among the most interesting facts of modern physiological life is the doctrine of the internal secretions. These internal secretions represent refining processes to prepare materials for the closest and most perfect assimilation. One very interesting fact is that the vaso-motor system, the regulative balance wheel, is itself controlled by two of these secretions, the thyroid and adrenal secretions.

In the ductless glands we find organs which in the earlier life act as blood forming glands, but in later life their function is transformed into that of blood disintegrating, blood detoxinating glands.

The body embryologically consists of certain segments, or regions, and in each of these segmental regions we find a series of glands. (1) In the head, the pineal gland, whose metabolism in secretion affects the bones and the nervous system, for nutrition; (2) in the neck and thorax the thymus gland and thyroid bodies, the former disappearing as soon as the independent white corpuscle life is established in the child life, the latter remaining through life as metabolic and secretory glands. The internal secretion of the thyroid is prepared, (1) by picking the toxic matter from the blood, (2) detoxinating it, (3) the glands living on the toxic matter and

metabolizing the detoxinated material into a secretion which is thrown out into the blood and carried to the nervous system, especially the cerebro-spinal system. It acts as a nutritive fluid. These bodies are very vascular and nervous, especially vaso-dilator. Myxoedematous conditions result from an abnormal condition of these glands, because of nutritive disturbances of the nervous system. The normal functioning of the glands prevents the body from being intoxicated, and as the nerves that enter the glands are strong vaso-dilators, the secretion when emptied into the nervous system stimulates vaso-dilation. Stimulation of the thyroid nerves lessens carotid blood pressure. This means that the secretion of these glands is the main stimulant to the dilator function of the cerebro-spinal nervous system. Here we have the completion of the cycle, the waste of the blood is converted into a nerve tonic, that tonic acting so as to promote cerebro-spinal nerve functioning over the blood system. This is part of the internal medicine of osteopathy.

The suprarenal bodies also detoxinate some materials in the blood, forming therefrom an internal metabolized secretion, which through the nervous system has a strong stimulating effect upon the constrictor or inhibitory function of the nerve centers in the medulla, with the result that it stimulates the constrictor effect of the dorsal region of the spine and the sympathetic ganglia upon the arterial walls through the sympathetics. Hence this secretion has a stimulating and reglative control of the arterial sway exerted over the blood circulation throughout the entire body. The fact that in the case of the division of the spinal cord and the removal of the medulla the same constrictor effect is produced upon the systemic arteries seems to demonstrate that the substance acts directly through the sympathetic nervous system. This is in line with the embryonic origin of the medullary part of the capsules, which allies the medulla of these bodies with the sympathetic system in structure and function. This makes the secretion of these glands stimulative of vaso-constriction.

#### THE BLOOD TONICS OF NATURE-- ANTI-POISON.

Here we have, therefore, two sets of bodies which are both concerned in preservative life processes (1) picking up and taking out the waste and toxic elements of the blood (2) bodies that utilize these in preparing substances used in governing the dilator and constrictor functions of the vascular mechanism, the twin blood tonics of nature-- the blood and the nervous system.

It is of interest to notice, (1) that the material is furnished from the blood to these glands, and the reaction results in the control of the blood itself, presenting a cyclical action; (2) in order to fit the material for organic use it, the substance, must be detoxinated. This represents, therefore, an organic law, that poisonous substances are not designed normally to reach the centers of vitality in the organism; those organs being placed at the gateways of the life processes, to prevent, as far as they can, the passage of toxic agents to the life centers. Thus the body itself teaches us the deleterious effects of the use of poisonous substances, teaches



us not to use crude drug poisons.

We can control these osteopathically, the thyroids from the middle cervical region and the suprarenal bodies from the splanchnic and vaso-motor areas of the lower dorsal and first lumbar regions of the spine.

#### THE REPRODUCTIVE SECRETION AND THE BRAIN.

The other secretion which is of vital importance in the preservative and reproductive functions of the body is the secretion of the reproductive organs or glands of the body, the secretion of the reproductive sexual organs. Although little is known of this subject, these glands are concerned in a very similar process in metabolizing and forming a secretion, both internal and external, concerned in the reproductive and preservative functions of the body. In addition to spermatogenesis and ovogenesis, these reproductive glands form an internal secretion. These organs are not glandular properly until puberty, the internal secretory function being most active about puberty. Hence these organs are both duct and ductless glands. Maturity of body and mind develop with the maturation of these organs. It is not unreasonable to suppose that the sexual glands secrete material of service in the nutrition of the brain and the nervous system. Serum therapy has at least in part demonstrated this. When these glands are impaired the blood is deficient in nerve and brain food.

These sex glands are united to the cerebro-spinal system by double connecting links at the extreme opposite end of the nervous system. Thus the nervous circuit from brain to sex glands is complete and its integrity of the circuit depends on the same blood waves as the rest of the organism. If these glands are weakened they return to their distinctive animal function, failing in the internal secretory work, thus affecting directly the gray matter, the brain through deficient nutrition. This reacts in turn upon the sympathetic system and there is as a result the upsetting of the rhythmic harmony of the nervous economy, such as is found in hysteria, neurasthenia, insanity. The re-establishment of the preservative and reproductive function depends upon the adjustment of the brain with these sex glands through the arterial rhythm of the blood system and the connecting nerve fiber system, as they co-operate through the machinery of bone, muscle, etc., in the body mechanism. These are the foundation principles of physiology in osteopathic therapeutics.

Richerand, professor of medicine in the University of Paris, and surgeon-in-chief in the Hospital of St. Louis, Paris, in a work published in 1811, says: "Medicine, called by some the art of healing, by others more properly the art of healing treating diseases, may be defined, the art of preserving health, of curing diseases, or of rendering them more supportable; medicine in all its parts, is enlightened by physiology and cannot have a surer guide. Owing to a neglect of this suspicious guide, therapeutics and materia medica long remained involved in a mist of conjectures and hypothesis. Physicians should never for a moment forget, that as a great number of diseases consist in the derangement of the vital functions, all their

efforts should tend to bring back sensibility and contractility to their natural conditions." Dr. Dellys, the English translator in the third edition of his translation, published in 1819, commenting on this, in a footnote, says, "all diseases consist in (a) physical derangements, as solutions of continuity, displacements; (b) Organic alterations, as polypi, aneurisms and other affections resulting from organic affection and alteration of structure; vital lesions, as fevers, ataxias, etc."

Tischerand in another place speaks of (d) "synergies or aggregate motions tending to one end and arising out of the laws of sympathy" as constituting general diseases and most of the local diseases. "It is by means of them and through these kind of organic incurrections that nature struggles with advantage and rids herself of the morbid principle, or of the cause of the disease; and the art of exciting and directing those actions furnishes the materials of the most important doctrines of the practice of medicine. I have used the terms direct and excite; for it is necessary at times to increase, at others to diminish their intensity and force, and on some occasions to excite them, when nature overwhelmed by disease is almost incapable of reaction. This last circumstance belongs to the diseases of the most dangerous kind, if we include those in which the efforts of nature, though marked by a certain degree of energy, are without connection or consent, and frustrated by their want of coherence . . . Life consists in the action of stimuli on the vital powers."

This expresses in a form that we cannot improve upon the idea of medicine, that of treating disease, or rather of the body in a diseased condition, so as to remove the cause or causes of disease and assist in restoration to or towards normal. This treatment must be along physiological lines.

Dr. H. F. Pierson in the Hahnemannian Advocate, defines disease "as a disturbed relationship between the vital force and the organism over which it has control." This explains the relation of neurasthenic conditions in the male and female to after effects, such as sterility, impotence and pelvic diseases. Hahnemann defined the vital force, "that immaterial, automatic energy which animates the material body of the organism, rules with undoubted sway and keeps all parts in harmonious operation as regards both sensation and function." As Dr. Pierson justly says, "material substance, in and of itself, does not possess the property of action. It must be acted upon. The energy or force which permeates the material substance must be the cause of all activities. It follows as a logical sequence that all chemical action and reaction in the human organism is due to the primary elements which constitute the substance thus brought into intimate relation. \* \* \* All growth and development is dependent upon the power of this vital force or energy within the individual cell to appropriate, from the common supply of nutritive material, such elements as may be necessary for the repair of all defects. \* \* \* Every substance exerts its peculiar influence upon other substances only through the medium of the vital force. \* \* \* The normal, natural function of the vital force is so to act upon all material substances coming within its influence so that new material

may be prepared in nature's laboratory for the maintenance and development of the functional activities of the organism."

This is a splendid statement of the philosophy of vitality from an osteopathic standpoint. We mechanically remove obstructions that hinder free play of parts of the body, stimulate or inhibit the articular and other sensations, so as to give free play to nature in the distribution of energy, so as to restore the harmony and equilibrium of the parts to each other and the whole.

Here we have a statement of the relation of vitality to disease.

#### THE PHILOSOPHY OF OSTEOPATHY.

Dr. D. L. Tasker comes nearer striking the keynote of the true philosophy of Osteopathy than any one else so far, in his statement, that "it is the vital and not the mechanical principle which keeps up a condition of maladjustment. \* \* But why does the work have to be done over and over again. Surely this is evidence that the vital element is controlling what we choose to call mechanical lesion."

These are significant words and contain a deep mine of philosophy that as yet we cannot fully understand. Three years ago in the first lecture we delivered in the department of physiology in the American School of Osteopathy we took the same ground. "Life is that science and art of relations, physical, chemical and vital, which gives us certain phenomena that we characterize as manifestations of vitality. \* \* \* The properties or relations of the human body are chemical, physical and vital. These relations when harmoniously sustained through a succession of time in the individual organism constitute life from a physiological standpoint. Any interference with or interruption of these harmonious relations constitutes abnormal vitalism and causes life to consist of abnormal vitalism and causes life to consist of abnormal manifestations of those phenomena that depend upon these relations, chemical, physical and vital, resulting in disease, deformity, abnormal functioning or structure."

In the January issue of the Pacific Osteopath Dr. Tasker, writes, "the human body is vastly more than a machine; it is a vital mechanism, and the fact that it is vital renders it susceptible to other influences besides mechanical, such as falls, twists, strains, etc. We may truthfully say that when the physiological is over-active, the anatomical alignment is disarranged. \* \* \* Osseous lesions have always been paramount in our work and thought; but muscular lesions now hold an equal place, and bbd fair to lead when we see more clearly into the subject." This is an important point and justifies Dr. Tasker's idea that we must not adhere too closely to the conception of mechanical lesions, because "there are diseases

not due to misplaced tissues," involving change in function, altered reflexes, etc. Undoubtedly lesions cover bone, muscle, ligament, nerve or cell, in fact any tissue and any function. In correcting an osseous lesion one point sometimes overlooked is the effect upon the articulations and through the articulatory sensations upon the body vitality enthroned in the central nervous system. Every tissue structure and every functional activity sustains some definite relation to that vitality which animates every tissue of the body. This is where medicine has failed to get the proper idea in connection with therapeutics.

This is not a new idea. We have seen it in germ at the close of the eighteenth century. Richerand regarded the majority of diseases as derangements of the vital functions, hence curative principles should be applied, with the view of restoring sensibility and contractility to the normal. DeLays classifies disease under the heads of, (1) physical derangements, (2) organic alterations, and (3) vital lesions. "Life consists in the action of stimuli on the vital powers" says Richerand and any variation in these stimuli causes unhealth. Hence to "excite and direct" the activities of what he chooses to call "sympathy" furnishes the most important principle applied in over-bearing disease. This does not mean that osteopathic principles prevailed at that time, but that the germinal principles were in the process of evolution. Hilton's use of pain as an indication of nature's demand for rest is along the same lines. "Hilton by showing that the skin, muscles and synovial membrane of a joint, or the skin and muscles of the abdomen and contents covered by peritoneum are innervated from the same segment of the cord, laid a foundation for the rational use of inhibition in osteopathic practice". Thus Dr. Fasker places in the proper light the relation of older scientific truths to osteopathic theory and practice.

What is the necessity of this philosophy? Dr. C. M. T. Hullett aptly says, "it is a philosophy which profoundly affects, not only the superstructure, but the substructure of our knowledge of life manifestations and limitations." Dr. Wm. E. Quinn says, "Medicine is but the servant of nature. It may stimulate her to more energetic effort; it may restrain too violent action; it may guide aberrant action; but its power is in all cases limited to the modification or support of the natural processes and it is the natural processes themselves which affect restoration to health." That is, instead of man having a common vitality his organism has certain vital powers, such as circulation, and these vital powers constitute the man. (Philadelphia Medical Journal, Dec. 16, 1896). Dr. Hullett writes, "this indicates the position to which even the users of drugs are coming, but I believe there is one very important differentiation which may be insisted upon, even in this statement, or rather in its application, which is, that drugs can only affect the field of destructive metabolism, constructive metabolism and bioplasm, that is, activity, is wholly within the control of the organizing principle (extra-materialistic) organizing principle, the source and spring of function, and therefore outside of the field of drug action. Drug medication conforms to the materialistic evolutionary idea that 'form determines function,' while the true therapeutic principle that function determines form. Osteopathy must of necessity rest on the more and form determines function,

modern idea that 'function determines form'. -\* \* The medical world generally taught that the sick body needed extraneous help. Our people taught and proved by their work, that it did not. In order to maintain our position forensically, we must know why it does not.

This puts very succinctly and truly the real question of the philosophy of Osteopathy and what we are looking to science, especially the chemico-biological sciences, for the solution of. President Japp in his presidential address before the chemical section of the British association for the advancement of science brings forward some interesting points on the chemistry of bioplasmic substance with a view to the solution of the relation of vitalism or vital activity to chemical changes. The foundation of this doctrine, or principle, is laid in the field of bioplasm- all bioplasmic substances form the not chemical, but vital-chemical changes.

There is just out a work that will be read with profound interest by all students of osteopathic philosophy, Prof. Loeb's work on the "comparative physiology of the brain." We cannot accept of a great many of his statements and conclusions, especially in the field of psychology. It is in the field of biology that the strongest part of the work is found. His conclusions are purely materialistic, for example, happiness "is the natural and harmonious expression of a man through his instincts."

If Dr. Loeb's theory is correct, the law of nerve force based on the series of centers in the central nervous system is incorrect, the structure of the central nervous system being comparatively simple, the difference in muscular and organ activities depending on "the varying complexity of the muscles or organs themselves." He defines a reflex, which is the most simple activity, as "a reaction which is caused by an external stimulus, and which results in co-ordinated movements". The only essentials to such reflexes are "irritation and conductivity", ~~Excitation, transmission, and every nervous reaction, however complex and complicated, can be analyzed into component reflexes.~~ This makes the central nervous system only an assistant, because it is not "the presence or absence of ganglion cells which determines the spontaneous rhythmical contractions, but the presence or absence of certain ions, "the cause being a chemical one"; "the nerves and ganglion only play the part of a more sensitive and quicker conductor for the stimulus," the physical qualities of the bioplasmic substance determining activity. In the actinian and the starfish we find negative and positive geo-tropism, a force which turns to or away from the earth, the plant exhibiting helio-tropism by virtue of the force turning towards the light. In all these cases this tropism represents vitalism just as other small animals move away from the light into dark crevices in connection with negative heliotropism, the nature of the reflex depending "on the disturbing (negative) or non disturbing (positive) chemical stimuli."

Dr. Loeb concludes that "the central nervous system does not control response to stimulation, it merely acts as a conductor from the point of stimulation through which the weaker stimuli may pass, and pass more rapidly than would be possible if the muscles were stimulated directly. In worms direct impulses flow from the neighboring muscles to the muscles that have been deprived of the ganglion, while in vertebrates, as soon as the spinal cord is destroyed, the

protoplasm connection between the skeletal muscles and the rest of the body is destroyed and it is not possible for stimuli to be transmitted." The brain, representing the great mass of ganglion cells in its cerebral hemispheres is necessary for "associative memory" being simply a terminal "appendage to the central nervous system," injury to those areas affecting the segmental fibers which lead to the destruction of "the use of the organ or muscles to which they lead."

Among his conclusions which we find, (1) "the reflexes are determined chiefly by the structure of the sense organs, or of the surface of the body and the arrangement of the muscles." (2) "The central nervous system participates in these functions only as a conductor." (3) "The true problem with which physiology is concerned is the MECHANICS of protoplasmic conductivity." "This problem is no longer a biological problem; but a problem of physical chemistry." (4) "All the so-called psychic phenomena are functions of the associative memory." In the search into the physical nature of associative memory, we must look to physical chemistry for a solution. The simple reflex represents the ~~response of an organ or group of organs to a stimulus~~ reaction of an organ or group of organs to a stimulus; while instinct represents the response of the entire organism, "a chain of reflexes." When "all the instincts can be maintained at a certain optimal intensity" then there is the resultant happiness.

Dr. Loeb calls attention to the chemical side of organic reactions. It is true - that the structure of the sense organs, the skin, muscles, etc., determines the nature of the reflexes, we have here one important principle bearing on the osteopathic theory of lesions. The unimpeded distribution of the vital force, whatever that may be, depends upon the preservation of the normal form of the muscles, skin, bones, articulations, etc., because when these are abnormal there are normal reflexes, and these give rise to unsympathetic conditions of the organism, the natural vital processes are incoordinated, which means unhealth. This idea gives confirmatory value to the principle of Byron Robinson in regard to the abdominal brain. We require to extend this principle, however, beyond the abdominal brain to what we might call the peripheral brains, or the analogy of the peripheral hearts compared with the central heart, these peripheral brains representing the activities of all peripheral parts in which we find the terminal forms of nerve tissue. This is the principle that lies at the foundation of cricifacial surgery, which attempts to free from obstruction those terminal forms of nerve tissue in connection with the other tissues, such as muscle, when the inhibitory action is so strong that release is impossible otherwise, in order that the vital force of the organism may be free and unobstructed in its distribution through the organism.

The same principle will apply to all osteopathic work, displacement of bone, muscle, ligament, perverted articulations, interference with fluid motility and nerve conductivity, represented by the modified irritability of pain, tenderness, paralysis, etc., indicating that anomalous condition of the normal reflexes which throws the organism out of sympathetic working order and produces unhealth. The principle of correction or removing obstruction and interference would thus naturally be the primary idea at the foundation of the

practical work. As a secondary idea there would be inhibition and stimulation, physiologically produced by mechanical operation, to correct the distribution of this vital reflex force and thus to equalize the organization from the standpoint of vitality.

Thus from an osteopathic standpoint we will find life to be the manifestation of certain vital phenomena, in connection with (a) chemical changes on a proteid basis, in relation to potential energy as its manifestation. Here we will find all those chemical reactions brought out in the chemistry of living substance in relation to the vital force. How a new chemical reaction can produce immunity, how the changestaking place in the chemical relations of solids and fluids are the basis of vitality and vital activity—these and similar problems are as yet unsolved. Chemical relations and reactions alter the fluids and forces of the body and this alteration reacts on the organism as a whole.

(b) Histological changes, taking place on a cell basis in connection with cell divisibility and integrity. Here the Virchow dictum will always hold full sway, that "every animal presents itself as a sum of vital unities, every one of which manifests all the characteristics of life". According to this, (1) the cell represents the ultimate unit in all the vital activities, and (2) the sum of all these ultimate units, representing the correlation and inter-dependence of the different unit cells, is the animal organism, whose perfect functioning depends on such unity in vital processes. "The composite of a large body amounts to a kind of social arrangement, an arrangement of a social kind in which each of a mass of individual existences is dependent upon the others, but in such a way that each element has a special activity of its own and that each, although it receives the impulse to its own activity from other parts, still itself performs its own functions. The result of an excitation or irritation may be, according to circumstances, simply a functional process, or the institution of a stronger or a weaker nutrition of the part, without necessary excitement of its function; or the establishment of a formative process which creates more or less new elements." Here the cell is the unite behind every combination of cells in the formation of an organism.

This idea is fundamental to osteopathic physiology and differentiates the pathological histology of the older schools from our own. The unity of the vital processes in connection with the vital force or sympathy of vitalism is necessary for the health, harmony and integrity of the body.

(c) Physiological changes on a definite tissue basis, in connection with functional tissue differentiation, tissue development and organ activity. Tissue consists of certain cellular and inter-cellular elements united together on a differentiation basis, the differential giving us the special kind of tissue. (1) According to this, while evolutionary philosophy, development or embryology, gives us function determined by form, and while this may be true in tracing out generic characteristics in the adaptation of the tissues to the form of life, (2) the true philosophy of physiology is form determined by function. Thus Marey says, "muscle can only act under the condition of being attached by its vessels and nerves to the rest of the organism. No portion of the body, not even the bones themselves,

which have the least vitality, can be free from this necessity." In other words, vitality and vital relations limit the activity of the different parts. Marey tries to work out the principle of Guerin, "function makes the organ," the bones, the articulations, the muscles being modified by functions, "these changes of function under the influences of the function itself are accompanied by anatomical modifications in the apparatus, physiologically modified." (See Marey's *Animal Mechanism*, Chapter 9, pages 85-101.) Here we have the combination of physiology and physics, or the underlying principles of these two sciences, in connection with alterations of functional activity of muscles, organs, bones, etc., in the production of these pathological conditions that we find in osteopathic conditions. The combination of sciences underlying the true therapeutics is anatomy, physiology, physics and psychology. Here we must take account of vitality for the abnormal vitalism gives us abnormal functioning and a change in the form or structure, such as we find in lesions.

All the powers that animate the separate organs and parts of the body unite together and are combined in this life principle. This vital principle is constant conflict with the lifeless or inanimate, because the former is living, the latter lifeless. The theory of life in regard to its continued preservation is that of the relation of living to lifeless matter in connection with physiological alimentation, the material lifeless molecules entering the organism as food to be acted upon and in turn to produce chemical (composition) changes and physical (property) or aggregation changes, reactions in relation to vitality and nutrition. Thus the vital force determines individual life by acting upon and animating that which the organism takes in and produces a new reaction, reacts by becoming a part of the vitalized organism. In connection with this vital principle and the actions and reactions in relation to the chemistry of food, alimentation and assimilation we have that sympathy which binds together all the different organs and parts of the body so as to secure perfect harmony among all the activities taking place in the animal economy. This sympathy is not based upon chemical affinity alone but upon (a) those chemical (compositions), (b) physical qualities or (property), and (c) vital (extra materialistic) relations, actions and reactions that are sustained by the organism in connection with vitality. The nerves, therefore, are not the exclusive media of this sympathy, because some (muscles) receive branches from the same nerve and yet these muscles do not sympathize and some parts of the body are in close sympathy whose nerves have no connection except through the general nervous system. As Dr. Loeb points out, there is an inherent power of reaction to stimulation even after muscle separation from the ganglionic nervous system, indicating that there is no absolute dependence of the muscular systems upon the nervous system, the nervous system being simply a medium of conducting certain nerve impulses to the muscles, and back of this lies the life of the tissue and the organism, the principle dependence being that of conductivity. This is due to vitalism; it is not due to chemical reaction alone. We incline to the belief that it (the life of the tissue and the organism) is due to chemical, physical and vital reactions in combination, for the organism or part of the organism must be capable of being stimulated, capable of conducting the stimulation and of reacting in response to



the stimulation. All of these are vital properties. Bioplasm or vitalized protoplasm must be present before these vital properties exist. A dead body has not these properties and is beyond the pale of our treatment. In other words, the fundamental tissue and organ properties that must be present as a basic condition of therapeutic action, are

- (a) Mobility, the primary property of all bioplasm,
- (b) Irritability, the essential property of all differentiated bioplasm, and
- (c) Conductibility, the most highly organized property of bioplasm.

In the organism, provided these are normal, all the normal reflex actions are possible; but if they are abnormal, and a chemical, physical or vital change may produce this abnormality, then the resultant reactions are abnormal and a state of unhealth exists.

Here we have that trinity of operations— three types of activity, chemical, physical and vital— that is comparable to the trinity of matter, motion and mind which A. T. Still speaks of as the basic tri-unity of the living human organism which lie at the foundation of all other therapeutics. No one of these elements can be omitted, if we are to get a true conception of the organism. To make the chemical reaction alone the basis of our therapeutics, as Dr. Loeb does, is ultra materialistic; to introduce the physical reaction and unite it with the chemical, gives us the same materialistic philosophy as the other schools of medicine, giving us properties without vitality or vitality as the sum of properties; to unite the chemical, physical and vital, even although for the present we cannot explain how much such a union takes place, gives us the only rational philosophy of life and health, as well as of disease and death.

What the vital is we know not. This we do know that the body is not a machine that is wound up and capable of going on for a number of years wholly under external influence. The moulding and shaping of the organism proceed from within. Mental function is at the basis of every physical function. Behind the physical acts involved in digestion, respiration, circulation there is the mental state which determines the body condition. Recognizing the osteopathic principle that all nature's remedies are stored up in the human system, we have this psychic law of the mind's ascendancy and to carry it out the beginning must be made within. Sudden emotions affect the circulation, heart rhythm, respiration; destroy the secretions, impair digestion and even cause death. If such emotions become chronic, the vital principle becomes perverted in function and perfect nutrition of the system is impossible. Physiological chemistry has demonstrated that such chronic conditions produce toxic substances that interfere with every normal function, and physical equilibrium is impossible under such conditions.

Modern physiology is largely concerned with chemistry and physical mechanism of the different tissues, organs and functions and in this it gives place to two of the reactions of the organism. We must not overlook, however, the vital<sup>106</sup> action, whatever that means. Digestive, secretory, excretory, nutritive changes are all fundamentally vital. Virchow's idea comes in here to profoundly modify physiology. All the tissue cells of the body are vital units and every

change that takes place, in addition to the chemical and physical processes, depends upon the vital activity of these cells. Every fluid of the body is thus vitalized by relation to the vital force of these cells and bears about it this essential vitalism. In fact, according to the modern doctrine of secretion no nutrition takes place apart from secretion and secretion is the vitalizing process of association with these vital cell units or groups of cell units in glands, etc. Osmosis, chemical analysis and synthesis, are not sufficient to account for the substances found in these secretions; vital cell activity under the active stimulation of the nervous system must be taken for granted. The nervous vital force is there. Pure and simple chemosmosis or material chemotaxis cannot account for these changes.

According to Dr. Loeb the germ represents simply a few simple elements consisting of chemical substances. But this cannot give life. The germ is a cell, as such it is vitalized, and the process of development is both chemical and morphological. What takes place in the embryology of a new form of life is taking place perpetually in the renewal of the organism by physiological alimentation, the morphological combining with the chemical, how we do not know, action and reaction producing the net result new tissue, the repair of old tissue and equilibrium of nutritive conditions. This cell process is applied to all the tissue cells, the minor as well as the important cells of the body.

Virchow realized the necessity of this vital element. Disease, he says, is "one of the possible phenomena under which the life of individual organized bodies may manifest itself. The sole ground of all phenomena, healthy as well as morbid, is only life itself, and a disease detached from other life, existing beside it, and being for itself, has no existence. Life is cellular activity and the cell is not the simple vessel of life, it is itself the living part. Life is something given, something rendered possible by inheritance only, and therefore besides the forces permanently united to matter, there must be given a permeating force which is transmitted mechanically from member to member. Accordingly we distinguish in the living body two kinds of forces; the molecular forces and the exciting and excited vital force, by the combined action of which in the individual, organic elements, the elementary of cell forces, which we are in the habit of regarding as vital force in the wider sense of the term, are brought into action."

According to this we get the true idea. Disease is not an entity or separate existence, but represents a modification of life or of the phenomena of life. To a large extent the older conception of disease was something that of something actually taking possession of the body as a distinct entity and requiring exorcism. If there is a permanent and a permeating vital force, the one isolating and the other uniting all the individual cell units, then we have a working theory upon which to go in trying to figure out the philosophy of life and health, as compared with death and disease. And here we have a theory that can explain why we do not require an extraneous something added to the system in dealing with disease, but have within the system, those curative principles, forces and elements necessary for the palliation and cure as well as the prevention of disease. We wait for fuller light on this all important subject.

OSTEOPATHIC METHODOLOGY.

We have received some letters criticising our view presented in last Journal upon the position of Osteopathy. Why did we begin by a reference to the Nebraska decision? Just as a preacher requires a text, an editor requires a cue and the Nebraska case was the most recent one, so that to it we referred our ideas. We hope that everyone will give us credit for honesty in our views. We are not seeking to bring down Osteopathy into a position of inferiority to drug systems; nor are we trying to combine Osteopathy with a drug system. Every issue of our Journal has made it plain that we are for Osteopathy and unmixed osteopathic principles. We have taken occasion to state in our definition what in our view Osteopathy includes. We have frequently asserted that it is an anti-drug system. We have spent time and money in searching the archives of medical history and put on the witness stand reputable medical men of the old schools to testify that our ideas are orthodox. Among the first things we wrote was the following and we have had no occasion to change our ideas: "It seems opportune that Osteopathy should step in to claim the field of therapeutics, especially in view of the interminable conflicts in regard to the value and use of different drugs. Even physicians are losing faith in the cure-all capacity of the pharmacopeia preparations. Osteopathy goes beyond this skeptical stage, for it claims that the use of drugs is a disadvantage to the system and represents an unscientific method of attempting to cure diseases."

It has been our aim all along to try and put Osteopathy on an independent basis, where its theory and practice cannot be subservient to any other system. What are the conditions today? Some medical schools are talking of the possibility of reducing Osteopathy, with massage and hypnotism, to a single chair in a medical school. A great many Osteopaths are helping along this idea. Why are so many flocking to the cities, some to take a medical education, others to get practice? Unconsciously these are admitting the "surrender of the osteopathic system". Why? Some are taking a medical course to get status; others because they want drugs to prescribe them as they wish. Our principle is, the status can be acquired, equal to any practitioner, without yielding to the demand of drug practitioners. Many Osteopaths are leaving the smaller towns, because there are not enough chronic cases to keep them alive. The Osteopath has not been prepared to deal with acute cases, to deal with general practice, and as a rule the Osteopath is simply an office man. It cannot be expected that a man in a small town or country district will continue to raise as many chronic cases as will enable him to eke out a livelihood. Hence, the impression, gains that the city is the hunting ground for osteopathic work and hence, too, some Osteopaths get the idea that if they can dabble in drugs like wise, they will be able to deal with all sorts of cases.

It is this that we consider the surrender of Osteopathy. We have taken the position, and it was to help demonstrate this we wrote in last issue on the position of Osteopathy, that if we place Osteopathy in its true light as a new method, applicable to the whole art of healing, including surgery, we can give the Osteopath an educa-

tion and gain for him a status equal to that of the practitioners of the other schools of medicine. His pathy is a pathy as truly as allopathy, homeopathy, etc., and gives him qualification to meet all cases himself, without recourse to any successful and prominent practitioner of any other school-- in fact, it makes him so that he can settle in any locality, however small or scattered the district population, and appeal to the people, not simply for chronic and incurable cases, but for every case that means unhealth. This we consider true loyalty to Osteopathy.

This is the age of progress. In no branch of science do we expect to find forward movements more pronounced than in the field of medicine and surgery. New fields of knowledge are being opened up, adding wealth to the science of preserving and prolonging life and restoring health to the human organism.

Since man began to exist, sickness, disease and death have been on the wing. Under these circumstances man's sole ambition is to be cured. The history of the healing art presents many changeful epochs. Old systems have given place to new ones and yet imperishable truths of human anatomy and physiology have been added from age to age, until at the dawn of the twentieth century it would certainly be a marvel if the profession did not understand the principles underlying health, soundness of body and mental equilibrium.

No discovery of modern times can claim equal importance with the discovery and application of mechanical diagnosis and mechanical treatment. Surgery for long years, practised by the conservative few, represented this mechanical principle. America of all civilized nations seems to have run far ahead in complete prostration to a drug system, to such an extent that many of the qualified practitioners know little else but pharmacy and the materia medica of drugs. Star after star on the horizon of the healing art, from the days of Hippocrates to the days of Keith and Hilton, have contra-indicated the use of poisons, while the profession and the populace have been eagerly longing for a surer method of nature. Many people seem to have caught an inspiration by the wayside and little gems of wisdom are found scattered along the pathway of medical progress as stars of hope pointing the way forward and the prophecies of future success.

Among the few searching for a new light, we recognize A. T. Still. Finding that drugs did not avail to cure disease, he turned to nature and became a student of human anatomy. He reached the conclusion that the body is a mechanism, delicately constructed, finely adjusted, built on the principles of order and continuity and operated by the laws of physics, chemistry and physiology, such as we find embedded in the human organism. This opened up the mechanics of the circulation and the physics of nerve force; muscle, bone, ligaments and every tissue and fluid of the organism being subject to some mechanical principle or giving a definite response in connection with manipulation. To this he gave the name Osteopathy-- the charter thought being that the bones could be used in the execution of this mechanical theory as a medium or leverage for the application of stimulation or inhibition, or the correction of lesions.

Around this primal conception has gathered all the fruitage of nature in the field of the healing art and to this beautiful clustering system of nature remedy we apply the name OSTEOPATHIC MEDICINE AND SURGERY, not Osteopathy, Medicine and Surgery. It represents a perfect profession whose aim is to build up a perfect science and a perfect art, capable with dealing with all diseased and deformed or misplaced conditions without the aid of others and without recourse to "butcher" surgery or to "drugs" except as antidotal in the realm of toxicological medicine, and anaesthetic in surgery.

This is not the place to defend the science and the art. It has stood the test and being proved it has not been found wanting. Many misunderstand what it is. It is not spiritualism or any form of mental healing. It is mechanical diagnosis, mechanical therapy and mechanical surgery on a physico-physiological basis. Its fundamental aim is the restoration of the community and communion of organs and parts of the body so as to preserve chemical, physical and physiological integrity.

But Mr. Arlo is right in saying that Osteopathy is a method of the ars medendi? Is it not something more? Decidedly, no. The statutes which legalize Osteopathy state rightly that it is a METHOD, SYSTEM or SCIENCE, making these three words alternative expressions. "All method is a rational progress, a progress toward an end," says Sir W. Hamilton. Now, why did we say there was a new methodology? Because that covers the entire ground. The basic sciences are the same as those at the basis of other methods, chemistry, anatomy and physiology, including biology, because all the knowledge of science is ours as well as theirs. Where is the difference, then? Our interpretation of the facts of these sciences as bearing on the organism is entirely new. What does this method include? We have said before that the osteopathic principle includes a new view of that science or system whose fundamental aim is to preserve and restore health and prevent unhealth; and this new method includes diagnosis and treatment. A new view of the conditions of diseases at the basis of unhealth represents the fundamental philosophy of this new method; and a new view of the manner in which these may be dealt with so as to cure disease, prevent unhealth and make life more tolerable under abnormal conditions represents the practice part of our method.

In other words, here we have the theory and practice of Osteopathy included in the new Methodology and this is applied to the treatment of all diseases. Thus the great science or system divides itself into two great subdivisions, (1) the philosophy of life, health, etc., in relation to the organism, including what we call the principles of Osteopathy, and especially that fundamental doctrine of vitalism which lies at the foundation of the new ideas of diagnosis and therapy; (2) the different methods of applying this philosophy to all the different branches of the Ars medendi. So far the philosophy of Osteopathy remains an unwritten chapter. Some important articles have been contributed on the theory of the treatment of the spine, on the theory of inhibition and stimulation, on the relation between the correction of lesions and the restoration to health, on the relation of nerve energy to physiological functioning, but no one has yet lifted the veil and stated what is abnormal behind the mechanical lesion of bone, muscle, ligament, blood, etc. that causes disease and unhealth. The principles of Osteopathy, as

we have discussed them, are simply a preliminary chapter in the theory of the practice of Osteopathy. In this field some splendid work has been done, but much remains to be done in the deeper field of chem-biology.

A method has its basic ideas represented by philosophy and its practical side; both of these are new and both are included in methodology. As a reform school of medicine we take the well established facts of science, interpret them in our own way and formulate a philosophy and practice. My idea is that we take the healing art as a whole, and then apply our principles to the practical side of the art. The point of the profession as a whole is that the far reaching influence of this philosophy is co-extensive with disease or unhealth. Dr. C. B. McConnell takes the same position, "our students receive teaching in all branches of medicine, save one- *materia medica*. When I use the term medicine I mean it in the broadest sense- not simply drugs, as many people erroneously think." (Practice of Osteopathy.) Dr. M. F. Hulett in a well written article on "Osteopathy and Law", *Cosmopolitan Osteopath*, Jan. 1900, speaks of Osteopathy in this all comprehensive sense as "the fourth school of medicine." The Cour de Cassation, the Supreme Court of France, has decided a question which has been before the courts for seven years, that the treatment of disease by magnetic healing is the practice of medicine, in the wide sense. The court set aside the defence, "because it cannot be maintained nowadays that medical treatment is limited to the administration of drugs."

The A. A. A. O. convention at Indianapolis declared "that we formally record our determination to raise this standard \* \* \* until it shall include every department of therapeutic equipment, with the exception of *materia medica*." (Minutes, *American Osteopath*, Vol. I p. 112). Dr. A. C. Hildreth at that same convention presented this liberal conception, "That osteopathy is the practice of medicine in its broadest sense no reasonable minded man can deny, for he who heals the sick by manipulation, with a tub of hot water, or in any manner whatever, is a practitioner of medicine in the sense of healing disease."

The same physiological principle is applicable to a surgical operative case as is applied to a displaced hip or an acute attack of fever. It is the principle that remedial action is from within, not from without, and that nothing extraneous requires to be supplied, except the food elements. If we had a surgical case in which there is something in the form of a tissue growth or element dangerous to the organic life, we admit it should be removed, because dangerous to life. Who shall do it? If you hand it over to a prominent and successful surgeon, then you give up the case, because no surgeon of that status today would undertake it without outside interference. The case is his, that ends osteopathic work. Now there is no time when such a case demands Osteopathy so much as during, immediately before and after the operation. It is along these lines that we reason in claiming for osteopathic principles a surgical application. Surgical diagnosis, surgical operation, the before and after treatment, should be entirely osteopathic.

If anyone questions our point, that a case must be handed

over to the surgeon entirely before operation, we would refer him to the Code of Ethics of the American Medical Association, to which most of the prominent surgeons belong. "No one shall be considered a fit associate in consultation whose practice is based on an exclusive dogma." This rule "ostracizes from the pale of professional intercourse and consultation any person who believes contrary to what the Association thinks he ought to believe." This makes it that every surgical case must be handed over to the operator. We believe Osteopathy has a principle applicable to reformed surgery. Let us train to that end, to give to suffering humanity the full benefit of our practice.

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### OSTEOPATHY AN INDEPENDENT SYSTEM CO-EXTENSIVE

#### WITH THE SCIENCE AND ART OF HEALING.

In some mysterious way the attitude of this College to Osteopathy has been misunderstood. I find that some have the idea that the College teaches medicine in the sense of drugs. This College regards Osteopathy as an independent system. The charter of our College, the only recognition that Osteopathy has in the commonwealth of Illinois, contains this provision, "this college shall be and represent an independent medical school or system or method of healing or treating diseases and conditions of the body, said college using, applying and teaching the osteopathic theories of diagnosis and therapeutics, surgery and obstetrics, so as to maintain the same as an independent system or science of healing." Every member of our faculty is pledged to this principle and I hope to demonstrate to you why we are pledged to this fundamental conception of Osteopathy.

#### OSTEOPATHY AND MEDICINE.

We do not say that medicine is a generic term with Osteopathy as one of its subdivisions or branches. We do not place Osteopathy, medicine and surgery as co-ordinate branches. Osteopathy is not a branch of medicine or surgery. Dr. F. W. Hannah, at Indianapolis convention said, "Osteopathy is a complete system of therapeutics and as such is both medicinal and surgical in its own peculiar way." (Minutes of Convention, American Osteopath, Vol. I Page 46.)

In the July number of the FORUM for 1901, Mr. C. S. Andrews, attorney for the New York Medical Society, presents what he considers the present legal status of the practice of medicine. He tries to point out as against what he calls the charlatan, that law and reason are on the side of the regular practitioner. We agree with Mr. A. that the practice of medicine is not synonymous with the administration of drugs, unless where by statutory limitation it is expressly defined as such. The true practice of medicine is not the use of any particular means or method of healing, but, as Mr. A. points out, has reference to, (a) the proper diagnosis of disease, and (b) the utili-

utilization of all means by which disease can be prevented, alleviated or cured. In trying to set aside one grotesque fallacy, however, Mr. Andrews raises up another. He throws down the practice of medicine, viz: drugs, from the pedestal of practice, because it is not the practice of medicine; but when it comes to license, only the drug healer is to have a chance. The illogical position he takes does not need refutation. The law has already recognized that there are several systems of therapeutics. It has in wisdom refrained from discriminating between them. They are all placed on an equality, the constitution guaranteeing such an equality, free from discrimination. To say that a new therapy must come in through the door of an old, or all of the old therapies is illogical and in our opinion illegal.

The osteopathic system is true medicine and surgery, but not medicine and surgery as laid down for an allopathic, homeopathic or eclectic system. It proposes to diagnose and heal by new methods and those new methods demand separate recognition. The new system takes what it believes the natural and rational from all systems in addition to its own distinctive features. This new system recognizes the basic chemistry of the body, the basic medicine in the fields of toxicology, anaesthetic surgery and the physiological medicine of the organic constituents of the body organism. In this sense the law has justly held that existing statutes do not cover the new method, unless such regulative measures have been taken expressly with a view to include the new; and we think with this added dictum, with a view of recognizing it as an independent system, and placing it on an equality with the others. In this sense we believe the position of Mr. Andrews to be illogical.

A profession has existed from time immemorial whose object has been, however imperfectly fulfilled, to preserve health, and when unhealth existed, to attempt to restore health. The earliest traces that we have of a surgical or manual character, long before internal medicine was thought of. Surgery at this early era included midwifery Internal medicine came in towards the close of the Greek philosophic period. The mechanico-surgical idea, however, prevailed, for among the teachers of Hippocrates, we find Herodicus who treated even acute diseases by gymnastic exercises. Aesculapius was principally a surgeon. It was under the asclepiadae, or guilds of lay itinerating healers, that drugs became prominent as medicaments. Hippocrates laid down this principle, "diseases are cured by restoration of the disturbed harmony in being and action of the elements, elementary qualities, cardinal fluids and cardinal forces, nature, that is phusis, the vital forces inherent in the body, accomplishes the cure."

The history of medicine or healing from those days until the present has been a history of methods, schools and systems. Among these methods or systems we find Osteopathy, the heir of all those mechanical and physiological principles applied from remote antiquity to the present day. Osteopathy did not invent a new anatomy or physiology or construct a new pathology. It has built upon the foundation of sciences already deeply seated in the philosophy of truth, chemistry, anatomy and physiology, a new etiology of diseases, a new systematic method of treating diseases, gathering together, adding to and reinforcing nature methods of treating disease that have been accumulating since the art of healing began.



Osteopathy starts out with a new principle in therapeutics, namely, "the self sufficiency of the organism, without the help of any extraneous substances." The ration of drugs to the field of the practice of medicine is well expressed by the University of Edinburgh school of medicine which dates its chair, called "the practice of physic, from 1685. the oldest chair in the University, leaving the wider term medicine to include all the fundamental sciences, with obstetrics, surgery and public health.

The ars medendi or the practitioners of the healing art from the Indian days when medicine was a charm, or from Greek days when prayers, sacrifices, diet, with the unseen powers of nature, were dominant, to our own day represents the field of healing. Chemical theories of therapy have undoubtedly predominated for centuries, but with the development of modern science came the tendency to mechanical explanations of life and disease. Developing from the dependent on the Harveian doctrine of the circulation, we meet the first attempts to explain vital activities on a physical and physiological basis. Among them Borelli of Naples in 1680 attempted to explain the actions and functions of the body on mechanical principles, bone and muscle movement on the principle of leverage, digestion as a trituration process, secretion and circulation on the principle of physical tension. Mechanical explanations of life followed, Cullen and Brown emphasizing the importance of nerve action and excitability, according to which the whole phenomena of life in health and disease consist of stimuli. Since then anatomy, physiology and physics have been very active and among the defenders of this old nature principle we find Broussais attempting to get an anatomical basis for all diseases, Freind, Hensler and Ling applying the principles of mechanical mobility to the treatment of diseases. Why do I refer to these men? Because I love to think that in the succession of time from the earliest known periods of history our science of mechanico-physiological therapy has been in process of development. But the grandest triumph of this old time principle is found in the Osteopathic System, mechanical, physiological, anatomical, all combined in one, the fruitful discovery of Dr. A. T. Still.

We are not here to laud the grand old man who was brave enough to face the opprobrium of a world both of science and laity in order to be true to his convictions. History has done that. We are here to defend the system. The law has vindicated and recognized what history has set forth, that Osteopathy is a method, science or system of treating diseases of the human body. This means that he have a system, scientific in its character, whose aim is to promote health, prevent unhealth, as far as these are possible, for the individual and the community at large. Health is the great prime conception at the foundation of our system. To promote this great object we have an ars medendi of our own, not the tail end of any other system, preservative of and restorative to health, as well as preventative of unhealth. Our reformatory system applies to the whole healing art, and in the eye of the law, we have the highest sanction for our profession which justice, right and truth can give.

The late U. S. Justice Field, in speaking of the medical profession, said judicially, "it has to deal with all those subtle and mysterious influences upon which health and life depend, and requires not only a knowledge of the vegetable and mineral substances, but of the human body in all its complicated parts and their relation to each other as well as their influence upon the mind. \* \* \* The same reasons which control in imposing conditions in compliance with which the physician is allowed to practice in the first instance, may call for further conditions as new methods of treating disease are discovered \* \* \* or a more accurate knowledge is acquired of the human system and of the agencies by which it is affected." (Dent vs. West Virginia, U. S. 129.)

The Supreme Court, ex-cathedra, through Justice Field, lays down this as the fundamental constitutional maxim upon which our system claims the right in this free country to recognition. The statute law of the different states that have recognized the system carries out this principle in the manner of regulating the practice, not legalizing the system, because right can never be legalized, never needs to be legalized. Wherever the flag of this republic floats its constitution holds sway, and there this science and art as a child of truth by right has a place and nothing can do it.

Osteopathy, therefore, opens up, in terms of this decision, that field in which a system of nature can have the fullest scope. It does not take any illogical position so as to oppose a drug system or any other system. It claims to be the heir of all that is good and true in the history of the healing art and to be co-extensive with the field of unhealth, including all those principles which are requisite to make it a perfectly successful and all sufficient system. It does not come in to occupy a back seat, a seat in the gallery or in the pit of the great theatre of the healing science, but, as I said once before, to compete with other systems and as it expands to outlive them.

#### DEFINITION OF OSTEOPATHY.

We have seen no reason to alter our definition of Osteopathy, formulated nearly eight years ago, with the approval of Dr. A. T. Still, Dr. A. G. Hildreth, Dr. C. P. McConnell, Dr. L. A. Tasker and others.

Osteopathy is that science or system of healing which emphasizes, (a) the diagnosis of diseases by physical methods with a view to discovering, not the symptoms, but the causes of disease, in connection with displacements of tissue, obstructions of the fluids and interference with the forces of the organism; (b) the treatment of diseases by scientific manipulations in connection with which the operating physician mechanically uses and applies the inherent resources of the organism to overcome disease and establish health, either by removing or correcting mechanical disorders and thus permitting nature to recuperate the diseased part, or by producing and establishing anti-toxic and anti-septic conditions to counteract toxic and septic conditions of the organism or its parts; (c) the application of mechanical and operative surgery in setting fractured or dislocated bones, repairing lacerations and removing abnormal tissue growths or tissue elements, when these become dangerous to the organic life.

The legal description of Osteopathy is, "a system, method or science of treating human diseases." Is there a field for such a system?

#### DIAGNOSIS THE KEYNOTE.

In this system there is, (1) physical, anatomical and physiological diagnosis. This will always be the ground work of the Osteopathic system. It is based upon an absolutely certain knowledge of the structure, architectural technique and functional activity of the body and of its parts. In this diagnosis we gladly accept the help of palpation, percussion, auscultation, chemical and microscopical aids, in the analysis of the secretions and excretions of the body.

#### THERAPEUTICS THE CORNER STONE.

(2) Osteopathic therapy. The organism from the therapeutic standpoint, is a vital, self-regulating and self-recuperating mechanism, that requires,

(a) The perfect adjustment of every part and the perfect activity of every tissue, especially the blood;

(b) The proper environmental conditions in the form of hygienic conditions and those necessary stimuli which lie at the basis of vitality; and (c) the proper food supply including the materials furnished as diet and water. Hence the therapeutics of Osteopathy includes, manipulative treatment tending to restore to the normal the adjustment by means of correction of lesion, stimulation or inhibition of functional processes. These open up the normal processes in the organism, or being converted from a mechanical into a physiological equivalent within the organism, the organism has the power to adjust itself, to use its inherent materials and forces and vital activities to restore to the normal. Here we have the internal medicine of Osteopathy, what the organism itself supplies as the basic medicine of healing. The other field of therapeutics include proper attention to diet and hygiene, including exercise, environment, open air, sunlight, etc. Recognizing the presence of bacteria and their toxic products we also recognize in the field of hygiene the necessity for certain anti-toxic and anti-septic conditions. These are largely within the organism itself. The system as I understand it, recognizes the basic medicine in the field of toxicology, surgical anaesthesia and the physiological medicine of the organic constituents of the body organism.

(3) Recognizing that therapeutics may fail in the case of fractured bones, ruptured muscles or ligaments and false growths, we recognize that mechanical and operative surgery is a part of the Osteopathic system, the object being to set fractured bones, to repair lacerations and to remove abnormal growths, when these become hazardous to the organic life. We do not admit that surgery is outside the field of Osteopathy. Osteopathy, it is true, has been largely anti-drug and anti-knife, necessarily so. Like every other system, Osteopathy was not born in adulthood, but in infancy, and its progress toward manhood has been a marvellous, unparalleled growth. Discoveries were slow in the art of healing, because men concentrated attention on drugs, forgetting the anatomical and physiological facts

that lie at the foundation of the body. Even surgery was decried, because it was mechanical. But surgery has a history that antedates authentic history. Rightly at the birthtime of the Osteopathic system, Dr. Still started out with the conception that the healing art should be carried back to its primitive standing ground, nature, and hence he formulated the plan of reforming surgery, obstetrics and the treatment of diseases in general.

This reform was to be developed on a scientific basis, for osteopathy is scientific if it is truth, because science is knowledge and truth. At first it was only applied to chronic conditions and many thought that here was found the limit of its usefulness. But that system which began with the blood and nerve force, as the warp and woof of life, as the basis of vital existence, and the anatomical and physiological integrity of tissue structures and organs, could not rest in its progressive development short of embracing the entire art of healing. Osteopathy is anti-knife, because it loudly protests against the indiscriminate use of operative surgery, especially of the butcher type. But the osteopathic principle which we laid down, "the self-sufficiency of the organism of and in itself as a self-recuperative mechanism," recognizes that when traumatic conditions produce a solution of continuity in the osseous, ligamentous and muscular structures, there must be a method of repair founded upon mechanical and physiological principles.

In this sense osteopathic surgery is as original as osteopathic therapy. In the great field of fractures osteopathic philosophy emphasizes the necessity of applying the principle of mobility as opposed to the immobility of older surgery. Dr. Lucas-Championniere, of Paris, has applied this principle with success in thousands of cases at the Hospital Beaujon, mobility tending to promote rapid repair. It recognizes also the principle of anaesthesia in pain, absorption of effusions, the promotion of trophicity and nutrition by mobile manipulation. It places the principle of absorption as a substitute, to a large extent, for external drainage, absorption being promoted by osteopathic mobility and manipulation of adjacent tissues, blood and lymph. In spinal caries, the Roth principle of surgery is the stimulation of vital activity through the stimulation of the muscle fibers in the affected region, vitality overbearing devitalization. It recognizes that under certain conditions abnormal growths endanger the organic life and that these must be removed on the osteopathic principle of DERNIER RESSORT. This can be accomplished successfully only when the physiological principles of the organic vitality are preserved in their integrity and when in connection with the operative procedure, measures are taken to build up, to promote granulation by first intention, and to prevent infective processes by utilizing the functional activities of the body. Such is the field of Osteopathic surgery.

Dr. George R. Fowler of Brooklyn, N. Y. in speaking of the fondness of the young physicians for surgical operations, asks the young surgeon to realize "that the surgeon after all is but an accomplished physician with a trained hand and a readiness to employ mechanical resources in special conditions." Dr. Byron Robinson lays down the osteopathic principle, when he says, "the universal rule is to sacrifice only hopelessly diseased tissues." (Physician & Surgeon, Detroit, Mich. 01.)

We are not advocating a new profession or a new appendage to osteopathy. We are contending, first, for the FACT that the Osteopath is a surgeon; second, for the FACT that surgery, THE FIELD OF SURGERY, I mean, is osteopathic, just as we have made the FIELD OF MEDICINE osteopathic. We do not claim that every Osteopath should become an operative surgeon. About ten per cent of the medical graduates become surgeons in the proper sense of that term, because it requires skill, especially adptness, and above all, it requires osteopathic knowledge far reaching and above the average. That is why I wish the surgeon to be osteopathic. To handle cases successfully, and know when a case is surgical, demands such knowledge of what the surgeon should do in the case. If Osteopathy is properly taught and if surgery is taught as I have indicated, conservative principles will be applied. Some of you say you are Osteopaths pure and simple. That is exactly what I want to make the surgeon who deals with our surgical cases. You become osteopaths because of the mistakes and failures of drugs and a certain kind of surgery. You took the field of drug therapy and you applied your own principles in it. Do the same in the field of surgery and you will round out your profession.

Dr. Hulett said before the A. O. A. convention of 1899, "anatomy from the surgeon's standpoint and for his use has perhaps been more perfectly mastered than any other subject in the Medical Curriculum. \* \* \* But the surgeon's standpoint is quite different from that of the osteopathist and the subject of anatomy, so far as method of presentation is concerned, lacks much of meeting the requirements of the latter." That is exactly why we are contending that Osteopathy is co-extensive with the healing art.

The old surgeon has not the osteopath's standpoint of anatomy. The new surgeon can and must have it. If the osteopathic principles are eternal truth, they are unlimited in their range. Make the surgeon osteopathic. Even dentistry can be made osteopathic and the time will come when it will be, and there will be less tooth-pulling and filling for toothache, and more attention to the osteopathic side of dentistry in the care of the teeth and in the manipulative treatment that will give benefit to humanity.

This is not revolutionary. It is in line with the accredited policy of this Association. In 1899 this resolution was adopted, endorsing a high standard of osteopathic efficiency, "we formally record our determination to raise this standard, as the exigencies of our practice may require, until it shall include every department of therapeutic equipment, with the exception of materia medica." The Associated Colleges from its first inception took this wide view of the healing art. In laying down a standard for osteopathic colleges it declares, "it shall teach osteopathy pure and unmixed with any other system of healing in the sense of modifying the science of osteopathy by combining with such system, but this shall not prevent any college from teaching surgery as a separate profession." (Const. of A. O. A., Sect. XII, Art. 3) In thus recognizing the right to teach surgery, it takes it for granted that true surgery is not antagonistic to the osteopathic principle, in fact the field of surgery, like the rest of the field of the healing art, is to become osteopathic.

The veteran Dr. W. S. Davis, in his address before the American Medical Association, said, "It is true that drugs are often used today when they are not needed because patients demand them; but this will be changed when laymen learn that it is the function of the physician to teach them what to do to give nature the best chance to effect repair, what to do to make themselves comfortable and to preserve life. When they learn it is a physician's function to teach them how to protect others from the same ailment, to foretell the possibility of recovery or death and to avert or foretell complications."

Is the osteopathic system competent to do this? Is it entitled to be recognized as a science independent of other systems, and capable of performing this teaching function (the doctorate)? We say, yes. Why? The foremost object and purpose of all those engaged in the healing art is health. What is health? It is the ability on the part of the organs in the different parts of the body each to perform its normal function in harmony with all the other organs and parts. Unhealth is the inability to do this. Disease is the result of that unhealth. What is the basic idea of the osteopathic system. Health, then, is a condition in which every member or part is adjusted to every other member or part of the organic system. Unhealth represents the disturbance of, or interference with this adjustment of the body system, and that which interferes or disturbs is a lesion. Disease is the result or series of results that follow from or accompany this state of unhealth. Here the organic system includes both body and mind.

One other point: Is Dr. Osler right in identifying the physical means with massage? Is osteopathy simply massage or medical gymnastics? There are three special reasons why Osteopathy is independent of these systems:

(1) Osteopathy as an independent system diagnoses its own cases. The masseur does not diagnose his cases, but works under the direction of a physician.

(2) The osteopathic system brings out certain landmarks of the human body as a basis for its diagnosis and treatment. The masseur simply gives a general treatment without respect to the fact that there are particular muscles, bones, etc. in the body. The osteopathic physician must be thoroughly trained in anatomy, physiology and kindred sciences, and must know every nerve in the body and the direction of every soft tissue and ligament, as well as the path of the fluid streams.

(3) The osteopathic system is distinct from massage and medical gymnastics, because it is based upon the principle that there is a definite relation between every organ in the body and the central nervous system.

How are the correlations carried out? In two ways, (a) by the symmetrical arrangement of the spinal column. When you build a house you lay the foundation and build stone upon stone until you reach the top. The spinal column with its appendages is built on that principle of symmetrical mechanical arrangement, each segment having a significance and every member of the segmental arrangement having nerves passing out to supply particular regions and organs of the body

(b) Another way in which this connection is carried out is through the sympathetic system concerned in the visceral or internal organic life economy of the body. These represent the fundamental landmarks upon which the complete structure of the osteopathic physiological system is based.

I know there is a tendency, even among the Osteopaths, to place the osteopathic system subordinate to other schools of medicine. There are some Osteopaths who think that their education is not rounded out until they are able to dabble in drugs with the license of the law. In my opinion this is no accomplishment to the Osteopath.

One thing that is tending to destroy the scientific nature of Osteopathy is the tendency to mix Osteopathy with something else. They do not mix, however, because the osteopathic system is independent. We cannot hope to make much advance by trying to consider disease or its treatment from a dual standpoint. Some are claiming that it is an advantage to study the purely drug systems of treatment, so that we may see disease and its treatment from an all around point of view and so that we can give the remedies of the other systems if necessary. The only way to study such systems is to study them from a comparative standpoint, taking the osteopathic system as the independent basis and comparing other methods in theory and practice with our own. To do this we must have such knowledge of basic medicine as will enable us to appreciate and distinguish physiological, toxicological and surgical medicine from the materia medica of common usage. We will thus be able to see how osteopathic therapeutics covers the entire field.

In doing this we need to emphasize osteopathic principles. Too often many of us allow ourselves to be easily influenced by the older theories, even though we may wish to defend our own. This does not prevent us from admitting the good that is in other systems. We do not sacrifice by any means the brotherhood of the healing profession when we stand upon our own independent ground, claiming that we have a system co-extensive with the healing art. We need larger zeal with which to dig down deeper into the larger problems from a strictly osteopathic standpoint. Some have a desire for a medical education. As a matter of education that is all right. But it seems to me we need greater research from the strictly osteopathic point of view, rather than attempting to expend our efforts in study in the regular medical college. Can we do this? Yes, just as the allopath, homeopath and eclectic. We can direct our researches to the diagnosis and therapeutics of Osteopathy and thus make the ground more firm beneath our feet. There are the large hospitals of our country to which it should be our aim to gain access, where we can study thousands of cases, not to be seen outside of these hospitals and insane asylums. Thus we can gain information in a field as yet unexplored by most of our schools, widen our views and get a clearer basis for generalization in regard to our therapeutics. In doing this we make the basic foundation of our education as wide as possible so that we may not fall into narrowness and bigotry.

Scientific Osteopathy, then, means that we have an independent system and that it takes in the field of the healing art in its entirety as covered by the other schools of medicine. In this sense we are a school of medicine or healing. In saying this I mean

that the osteopathic system is entirely opposed to the method of diagnosing and the methods of treatment in the older schools. It is impossible for us to consider disease or treatment, or both, from a double standpoint, because we must sacrifice the one point of view to the other. With Osteopathy and the loyal Osteopath rests the problem of whether the osteopathic system is to stand as a separate system, or to be merged in the other systems.

If the osteopathic principle is true, it cannot be subjected to any other system principle. It is independent in itself. One thing that is dragging down our system is the character of some of the schools. We have several schools in Chicago that graduate Osteopaths without seeing them, professing to give by mail or otherwise in a few weeks, or even days, the principles and practice of this great system. Some of them claim that graduates of the parent school are behind them in this. There are men and women practicing Osteopathy, or pretending to do so, who know nothing about it and are misrepresenting us to the laity and the scientific world. Unless we can come to the help of our science in this respect, much detriment will be done to our system.

We do not need to go into other systems to get a plan or method. We have plans and methods in our own, but the problem is, how are we going to maintain that system on a purely scientific basis. We may argue as we please about the practical side of Osteopathy, doing this and doing that; but unless we can demonstrate in this day and age that this practice is founded upon great scientific truths, we cannot convert the world to our side. We talk of mechanical manipulative work as if it were the sum and substance of the osteopathic system. If that is all, we are no better than the masseur or medical gymnast and our system lacks what gives it force of character. Mechanical manipulation can be used with a definite anatomical, physiological and, for that matter, organic purpose. It can be converted into an organic equivalent and therein lies its therapeutic value. This does not mean that we are absolutely cut off from the rest of the healing profession. There is a field in which we can meet in common with those. Health, vitality, the health of the individual and of the community— that is the common object of all physicians. We may differ in plans and principles, but we are one in thought. This does not mean the surrender of our principle.

Dr. Reed, the ex-President of the American Medical Association, spoke at St. Paul, in very glowing terms of what he called the new school of medicine, or rather the old regenerated in the sense of absorbing in itself those scintillas of truth contributed by the newer systems, these new systems themselves dying. He divided the field of medicine into the "regular" and "sectarian" practice and claimed that the sectarian practice was gradually disappearing, just as Brunonianism, etc., disappeared, leaving a scintilla of truth behind. He never even hinted at the phenomenal growth of the osteopathic system. And why has it grown? It stands for the recognition of the neglected elements in the science of other schools and for the cure of the incurable patients of the other systems. In saying this we are not claiming that Osteopathy existed among the Greeks or Romans, but from the earliest dawn of the healing art there have been pro-



gressive men who have been tending in the direction of this culminating point in therapy.

What does the state of unhealth and disease include? A lesion, involving the solid or osseous and ligamentous structures; a contracture, involving the soft or muscular and other soft tissue structures; a relaxation also involving the soft tissues; irritation involving the nervous, neuro-muscular or terminal tissues; torpidity, involving the glandular, secretory or peristaltic and splanchnic structures; debility, involving the weakening, checking or aggravating, resulting in weakening of the sympathetic correlations of the different organs, with the loss of organic force and energy. What shall we do with these conditions? Correct the lesion on mechanico-physiological lines; relax the contracture or contract the relaxation; soothe the irritation and stimulate the sluggish torpidity by the stimulatory or the inhibitory power of the functional processes through the nerves, blood, lymph, terminal tissues and the great sympathetic system; and finally build up that which is debilitated by establishing normal correlations and by taking the weak and making it strong through the nutritive channel of food directed to the part weakened via the blood and nerve supply and the metabolism of tissues.

#### THE OSTEOPATHIC SYSTEM NOT ONE SIDED.

This is the basis and foundation of Osteopathy. Its fundamental philosophy briefly is, that we have an organism consisting of a body and mind, both subjective and objective, and these must be dealt with from the mechanical, physiological and psychological standpoints. Materia Medica deals with the body. In the opposite extreme you find men like Dowie and the faith healers taking the spiritual side of man's nature and emphasizing it as the basis of therapeutics. There is a certain amount of truth in this idea, because the organism is subject to the great universal law of suggestion. Prof. Max Müller, of Oxford, once told me, "one universal fact in connection with human life is that man has a religious consciousness and anything that will appeal to this consciousness will succeed."

The osteopathic system does not look at the body from a one sided point of view, but lays hold of the prominent characteristic of the whole organism, vitality. Vitality to the Osteopath is the vital force animating the body. The question of what life is has never been answered. Life consists of manifestations. Phenomena go to make up life. There is a chemical side to life. This is where the older schools think they catch us. We teach chemistry and that the body is made up of chemical substances. This chemical side of life so far as nutrition is concerned has two aspects, the anabolic and the katabolic. When you give a chemical substance it affects the katabolic side. You apply full force and energy to the body for the time, but you do not build up and that is where the purely chemical theory fails.

We quote from Dr. Osler because he puts more authoritatively than we can our idea. In the New York Sun of January 26th, 1901, in speaking of the extraordinary decline in the use of drugs as a

factor in the healing art, he says, "as the processes of nature have been more and more clearly revealed, by the tireless study and the ceaseless advance of science, the physician has grown in his understanding of the forces at work, for good or ill, within the human frame and so has come to see that the physical care of the body is more potent than medicining it; or if disease is to be fought with drugs chemically, it must be fought on the principle of fire fighting fire. One of the most striking characteristics of the modern treatment of disease is the return to what used to be called the natural methods, diet, exercise, bathing and massage." Dr. Osler here presents the two alternatives of modern therapeutics, the one physical and the other chemical. Osteopaths choose the alternative which Osler places first and calls a return to nature. Yet Dr. Osler seems to incline towards the other side "limiting the number of drugs used and depending in the main upon some of the strongest poisons in the pharmacopoeia," fighting fire with fire, on the allopathic theory.

Can the Osteopath by the physical method dispose of the chemical substances and deal with them? Yes. Why? The body in its completeness was given to us as an organism consisting of an immense number of cells. These cells are capable of self nutrition, self development and capable of reproduction. And in connection with this organism consisting of a large number of such cells, there is the capacity not only to use but also to create. The modern schools of biology have demonstrated to us the existence of secretory and synthetic processes, within the body. Whatever different substances may be created in the body, and they are actually created, out of other substances, taken in the form of food, water, oxygen, that body perfect in itself as an organism has the power of this chemical synthesis. When food, water, oxygen- the proximate principles of the organism- are supplied, the organism has the power of producing chemicals, alkalies, acids, etc., and these chemicals, with the vital processes and nervous forces constitute the internal medicine of Osteopathy.

#### OSTEOPATHY AND GERMS.

But we are met with another question, if your system is scientific, and all comprehensive, what are you going to do with the germs? What are germs and microbes? The body consists of a great mass of cells. Now the germ or microbe organism is simply a foreign cell trying to insinuate itself into the mass of cells forming the organism and everybody must believe these germs are a reality. How are we going to deal with them? There are two ways of dealing with them. We can use germicide and the best germicide is pure blood. Nothing is better than pure blood. It is the purifier and guardian of the body organism. In making this statement recently, it was called in question. We again quote Dr. Osler. "It is a well known fact that the normal blood has of itself, to a considerable extent, the power of killing germs which may wander into it through the various channels."

Another way in which we can deal with germs is by promoting the process of destruction. How? Through the parts of the body, the cells? This destructive process is carried on by means of the small

white corpuscles that float in the blood and migrate through the blood vessel walls. A large number of these blood cells exist for no other purpose than to make the organism immune from the germs. We have in our throats and lungs the germs of pneumonia and other diseases, from which we are rendered immune, because we have the germicide, pure blood, and because we have that ever flowing stream of blood, capable of stimulation by osteopathic means, so that its germicidal action can be intensified in the body.

Again we quote Dr. Osler, "Likewise the tissue cells of the body show similar action, depending upon the different cell groups, state of health, general robustness and period of life. The germ killing power varies in different individuals, though each may be quite healthy." He goes on to explain that when the patient feels out of sorts, the blood and tissues are engaged in repelling the attacks of the microbes. Thus they multiply and as they multiply increase their toxins. Does the blood then give up the fight? "No. On the contrary the white blood cells, the wandering cells, and the cells of the tissues most affected still carry on an unequal fight. From the lymphatic glands and spleen armies of white cells rush to the fray and attempt to eat up and destroy the foe." When toxins are developed with consequent symptoms of headache, fever, loss of appetite, pains and aches, loss of consciousness, what takes place? "In addition to the active warfare of the white blood cells, groups of cells throughout the body, after recovered from the first rude shock of the toxins, begin to tolerate their presence, then effect a change in the chemical constitution of the toxins, and finally elaborate substances which antagonize the toxins and destroy their action altogether, thus lending aid to the warrior cells, which at last overcome the invading microbes. Recovery is brought about, and a more or less permanent degree of immunity against the special form of disease ensues."

Roth laid down the same principle in dealing with tubercular diseases of the spine. Developing the vital structures, especially by the functional activity of the muscle fibers distributed to and acting on the affected area, the devitalized parts are increased in vitality, the tendency to destruction is overcome, and struggling nature, through the cells, is helped to regain control and check the current of destruction. This gives foundation for the idea that these diseases are self-limited, the strong cells have the vitalizing, as opposed to the devitalizing, power of the weakened cells. Is this not the reason why manipulative treatment applied to the fascia, the muscles, the blood and the lymph, and the stimulating treatment of the articulations around articulatory sensations, calls in all the forces of nature to the help of the weak cells?

#### VIRCHOW ON MICROBES.

That the doctrine of germs is falling into its proper place is evidenced by the position of Virchow, the celebrated Berlin pathologist. At the thirteenth triennial session of the International Medical Congress in Paris, he stated that too much stress is being laid on the microbe as a disease producer. "Microbes are always found where there is disease, but may be the result and not the cause."

Pathologists are multiplying after the type of Huespe, who believe that disease is more due to the lack of resisting power on the part of the individual organism than to the presence of microbes.

#### PAIN AS PHYSIOLOGICAL.

Another point, emphasized at this same congress, of great interest to us is, the idea of pain as nature's sentinel enjoining rest. To destroy, allay or check the pain, without removing the cause of it is to shackle the sentinel of nature that keeps guard over the sacred helath of the patient, while the sentinel is actively engaged in warring off the enemy of the organism. Osteopathically this means that to combat pains by anaesthetics is simply temporizing, the correct plan is to get after the cause and when this is removed then the pain will subside. This means the correction of an impingement, the removal of a congestion of blood or nerve force, the resolution of a contracture, the removal of a carious or proliferating substance, whatever it is, the removal of the cause.

"The Kneipp Water Cure Monthly and Herald of Health" has as its object "the development and maintenance of perfect physical and mental welfare, to the exclusion of drugs and non-accidental surgery." In the April issue W. J. Cromie, Physical Director of the Y.M.C.A. Easton, Pa., says, "the most prevalent causes of disease are muscular inactivity, the use of tobacco, alcoholic drinks and drugs; the emotions, improper eating and drinking and improper dress \* \* \* The American people are too prone to resort to drugs for every ailment. Drugs only affect a temporary cure." Moliere said "physicians pour medicine about which they know little into bodies of which they know less, to cure disease about which they know nothing at all. REMOVE THE CAUSE, take regular exercise, breathe the pure air deeply, drink good water freely, eat moderately and the physician's pills will not be needed." We are glad to see emphasis laid upon nature methods.

Dr. M. Smith put graphically the truth in a bried statement, "physic heals no disease. Disease derives its cure always and only from the vital force resident in man." Dr. Craigie put the same principle in his statement, "When healthy properties are impaired we know of no agent by which they can be directly restored; when vital action is perverted or deranged, we possess no means of immediately rectifying it, but must be satisfied with using those means under which it is most likely to rectify itself."

This emphasizes the fundamental idea of all nature methods that the vitality of the body is the curative agent. But the vitality of the organism depends upon the vitality of the multiplicity of cells that go to make up the organisa. In line with this Dr. Ludwig Staden says, "all physical life is based upon the change of matter of the cell or upon the vibration within the cell, the problem of life and health is the problem of the harmony of this vibration, for it is the essence of all manifestation \* \* \* Taking into consideration that physical life and health is based on the vibrative process in the cell, which we call change of matter, there is no doubt that the disease is simply a disturbance of harmonious vibration within the cell."

This is undoubtedly correct for the splanchnic or peristaltic and rhythmic activities of the different tissues and organs of the body, including the brain, form the basis of the life functions.

T. H. Pratt says truly, "all bodily processes except osmosis are accomplished by peristaltic action." Hence the physiological influences of manipulation are associated with increased circulation of blood to and from the cell, furnishing new material and carrying off effete matters. The nerves exert a most powerful influence over the nutrition of the muscles as well as of the skin and all the cells.

Hence the nerves form the immediate point of entrance to the more hidden and secret vibratile activity of the cells and tissues of the body. This vibratile activity is one of the phenomena of vitality. This does not mean that life, as Joseph Le Conte (science, June 15,) claims, is a form of energy akin to chemism, or to a particular molecular arrangement. "Vitality is a still more ultimate agency than chemism, which seems itself to act under the guidance of this vital principle \* \* \* The possibilities of the vitalized cell do not appear to us explicable by any known law of physics or chemistry as yet discovered."

When we get down to this principle it is easy to understand and explain the tendency to return to nature methods of therapeutics. Robert H. Babcock, in the New York Medical Journal of July 6th, 1901 pleads for a simple therapy, diet, water, healthy exercise, fresh air, etc., because of the public distrust of drug medication. Dr. George E. Francis, in the Boston Medical and Surgical Journal of July 4th, 1901, in discussing the subject of specialism, claims that medical treatment will become more scientific, hygienic agents taking the place largely of drugs. We are not surprised to find Count Tolstoi becoming skeptical of the physicians on account of the different diagnoses of his own troubles. "You excellent people know everything that medicine teaches, but medicine itself knows nothing." The nearer we get to a natural rational medical diagnosis and therapy, this will be overcome. Another factor which Osteopathy recognizes as a causative condition of obstruction or irritation, is poisoning—internal and external.

Dr. Ford Robertson, the great alienist psychologist, in discussing the pathogenesis and curability of insanity, strikes the keynote when he says that toxins are the main cause, especially those "generated by the living tissues in consequence of disturbances of the physico-chemical processes that normally occur in them." Now, in discussing this question we must get at the "nature, source, causes of formation and modes of elimination of the toxins." This opens up the field that lies behind the field of the pathology of insanity, namely the etiology of insanity. This etiology, as we believe and as Dr. Robertson states, is to be looked for in disturbances of physico-chemical processes. What disturbs these physico-chemical processes? This is the osteopathic philosophy must answer from a physico-physiological standpoint in connection with the various types of lesion found in such cases. Given the disturbing cause, etiological, then the disturbance of the physico-chemical processes with resultant physiological changes, pathological, we are in the straight line towards the explanation of the characteristic symptom-

atology of insanity. This will open up the field of prevention and relief of insanity to be discussed later.

Dr. A. Harrington Hall, of St. Louis, says, "You quote from Dr. Ford Robertson on the causes of insanity. Permit me to call your attention to another cause. I should call it psychological obsession. This cause is common among people who are sensitive to the psychological forces emanating from people both in and out of the body. The hypnotist's subject, is a good illustration of how these sensitives may be dominated by mental forces coming from some one in the body. The Occultist's medium, is an example of the same power from individuals who no longer inhabit the physical body. Now leaving out of the question, the proper development and cultivation of the various occult gifts, and the influence that such a course would have upon the patient for good or evil, it may be stated that to discriminately subject the brain to these forces, does eventually destroy its physiological functions, and that the objective faculties are the first to suffer.

There is a modified form of psychological obsession, and my experience with patients suffering from it, has demonstrated to me that there are many in our insane asylums who are victims of it, and who are not, strictly speaking, insane. I had one of these cases once, a young man. An examination did not reveal anything wrong. He declared that he was the most abject slave, this unseen power had him almost completely under its control, it was thrown over him at all times, he was not rendered unconscious during its visits, but his powers of resistance were gradually breaking down.

A good many questions come to mind at this time, regarding the purpose and origin of this power, but it is not my purpose-of-intention to discuss them. It is sufficient to say that the patient was as rational as any one whom not overshadowed by this force, and on a few occasions he passed under it during treatment, and that his actions were such while in that state, that I could readily figure out what his fate would be, were he in court under examination for his sanity. He was much benefitted by the treatment, which was directed to building up his will power. I write this, doctor, to bring before you one cause of insanity, which is all too little understood, even in this day of enlightenment."

We are glad that Dr. Hall brings out this point. In discussing the etiology of insanity it is important to remember that we must approach it from three points of view, (a) that of the body, physical and physiological, (b) that of the subjective mind on the purely psychic side, and (c) that of the objective mind on the physio-psycho-physiological side. The unseen power of the psychic forces which gain control of the mind of the individual may be purely subjective or objective. And here we have, as Dr. Hall points out, one of the most fruitful sources of so-called insanity. We will return to this subject later.

\* Apropos of obsession mentioned by Dr. Hall, these mental obsessions are imperative ideas, frequently ridiculous, absurd and dangerous, that arise in the mind and often subject the patient to much annoyance, simulating insanity and in some cases the prelude of insanity. Dr. Haskonce, of Prague, in the REVUE NEUROLOGIQUE for April, 1901, discusses these very fully. Pitros and Regis claim that

obsessions are simply aggravated phobias, operating in the intellectual sphere and thus are primarily morbid affective processes. Others claim that they are more akin to fixed ideas intellectually. According to Haskonce, the majority of cases are affective rather than intellectual in origin, a smaller number being intellectual in origin and a few mixed. In some cases the visual image gives rise to the mental obsession without any emotion. For example, the patient sees a hatchet and is suddenly overtaken with the idea of killing some one. Here there is a conflict between the obsession and the normal feeling; this gives rise to a secondary emotional derangement, fear, distress; in some cases this emotional disturbance becomes so great that self control is lost, resistance of the sudden impulse is impossible and some criminal action follows.

Haskonce gives the record of a case of a young man in whom the obsession of his not being really alive or existent recurred from time to time, without any phobia. Obsession is found frequently after sexual disturbances, involving miscarriage, abortion. Similarly in cases of brain over-exertion, aggravated constipation, exophthalmic goitre, toxic poisoning, there is the tendency to obsession. Dr. Haskonce has studied 110 cases of such obsessions and his conclusion is that these are to be carefully distinguished from the prodromes of melancholy, paranoia, general paralysis of the insane.

Up to the present time we have discussed the separate parts, structurally, and the separate activities, functionally, of the body. These parts and activities are so united together on the basis of adjustment as to form a perfect organism.

The perfection of the body organism depends (A) primarily upon the conjoint action of symmetry and asymmetry in the organism, and (B) upon something which modifies structure or structural adjustment on the basis of particular activities of the organism.

(A) Symmetry represents the tendency to equality on the two sides of the body, and asymmetry represents the tendency to deviate from this equality, for example, in the child both sides of the body are of equal strength; in the embryonic body the organs compensate for one another. In addition to the dual organs, the heart on the left side is compensated for by the liver on the right side. In fact, in embryonic life both of these organs are hearts, i. e. they perform heart functions.

In the mature body, and in the development of the body towards maturity, there is the loss of symmetry due to functional inequality depending on the needs of the organism or to something abnormal in development. The normal asymmetry is developed in the body for physiological purposes,

- (a) as a means of correcting,
- (b) as a means of compensating for, and
- (c) as a means of accommodating to certain changes that

take place in the body during the process of development.

This means that from the standpoint of examination and treatment asymmetry and not symmetry is the principle to be followed.

In development all the organs within the body cavity originate from the original alimentary tube, with the exception of the spleen, which is developed from the mesoblast. The brain in origin is symmetrical, but in development becomes asymmetrical, the two sides of the brain being developed in connection with the physiological activities of the body organs on the two sides of the body.

In osteopathic practice it is necessary to maintain this asymmetry in connection with the treatment of lesions. A lesion represents any kind of misplacement, enlargement, deviation from normal, or loss of tonicity, contiguity or contiguity. The lesion, therefore, may be either anatomical, physiological, or both anatomical and physiological, or environmental. By environmental I mean anything outside of the cell or combination of cells, such as climate, manner of life, water, poison, etc.

(D) Secondly, upon the perfect adjustment of the body, which means, the correction of whatever lesions are found in the organism. In connection with the lesion present, of whatever type, the main object is:

- (a) Negatively, not of necessity to correct the anatomy, because body development depends on mechanics, not on anatomy;
- (b) Positively, to correct the physiological relations of the different parts or conditions that are involved in the lesion. This implies that in the osteopathic work of correction both general and specific treatments are called for:



- (a) general treatment from the mechanical anatomical standpoint;
- (b) specific treatment from the physiological standpoint of relation; and
- (c) general physiological treatment is also of value in stimulating or inhibiting the fluids and forces of the body so as to develop a more or less active condition. This means that a general physiological treatment aims at establishing

1st: the tonicity in the structures of the body, and

2nd: the trophicity in the tissues and organs.

Unless these conditions are satisfied, the physiological value of the body is negative.

To get at the fluids of the body we deal with the vaso-motor system, principally the vaso-constrictors, that is, a general treatment of the middle portion of the spine, mainly by articulation between the 2nd dorsal and the 2nd lumbar.

To get at the forces of the body the best method is to give a suboccipital treatment, inhibition or stimulation as called for in the case. In this treatment we reach,

- (a) the cranial nerves,
- (b) the sensory nerves, particularly in their relation to the medulla, that is,
- (c) the basal blood supply to the contents that lie inside the cranium.

The medulla controls all the vital forces of the body.

Accessory to the suboccipital treatment is the treatment of the cervical sympathetic ganglia to reach the sympathetic brain, whose special function is to balance the action of the cranial nerves. Treatment of this order is more or less general and palliative, but corrective from the side of relations.

In diagnosis the important point is to find out (1) the disturbance of the system that involves the structures or functions of the body interfered with. (2) the cause, or causes of this disturbance, whether local or general. This may be classified under three heads:

- (i) misplacement of tissues or organ, or other structures of the body;
- (ii) disturbances of the fluids of the body, viz: lymph, blood, bile, saliva, muscle fluid, etc;
- (iii) derangement of the nervous system in its numerous parts, including fibers, ganglia, cells, plexuses and centers. Pathological conditions may develop

in connection with any of these fields,

- (a) in the form of perverted activity, or
- (b) in the form of altered structure, the former generally preceding the latter. The pathological condition may express itself:

(a) In a general way through the blood or the nervous

- (a) system.

- (b) in a special way through some particular condition of the body or some part of the body, in the form of lessened resistance, or increased activity;
- (c) the only view of the pathological condition of the body that can be sustained is that which regards the pathology as an interference, obstruction or irritation in connection with which we find some variation from the physiological, with resultant structural changes,
  - (1) physiological changes;
  - (2) physical changes, and
  - (3) chemical changes.

These three represent the pathology of diseases and the expression of these is the symptomatology of disease.

The morbid anatomy proper refers to the alteration in the histological structure of the tissues, muscles and organs resulting from some pathological change. Hence, in tracing the subject of diagnosis we must trace it out along three lines,

- (1st) from the normal of the mechanism and organism as a standard;
- (2nd) through the abnormal as it appears in the successive changes, hyper- or sub- physiological, physical and chemical. Hence, we have an obstruction of some kind, some type of interference or irritation and this represents the field of etiology;
- (3rd) the pathological condition resulting from the abnormal changes expresses itself by certain physical or vital signs. This is the field of symptomatology. The expression through the sign (physical or vital) indicating the change from the normal to the abnormal in the organism and mechanism. Hence, the pathological change is, first, physiological, and later, structural. From

this standpoint osteopathic treatment must take account of:

- (1) The liberation of the tissues, organs, fluids or forces of the body from obstruction, interference or irritation;
- (2) the treatment is designed principally to remove or relieve some condition of pressure in order that the tissues, organs, fluids and forces of the body may be free to perform their functional activities. This makes the complete physiological principle of life depend on the co-ordinated action of the tissues, organs, fluids and forces, that is, adjustment.

From the treatment side this means Adjustment in (a) the correction of structure; (b) the correction of physiological activity from the sides of physiological, physical and chemical conditions of the body and of its environment.

(3) In the application of Osteopathic treatment Osteopathic therapeutics uses

- (a) The principle of adjustment of the structural framework and tissues of the body as physical means of

- performing manipulative work, and
- (b) The principle of co-operation of the nervous system as a means of gaining control over the tissues, organs, fluids and forces of the body. This brings in any part of the nervous system that has to do with any of these conditions of the body, physiological or psychological.

(4) The nervous system is best influenced from the manipulative side of adjustment through the blood, because nutrition and the elimination of waste represent the only means that we have of reaching the cell processes. This includes the furnishing of nutritive materials to the blood through the digestive and metabolic fields and the assimilation of these materials to the structure of the cells.

(5) Osteopathic treatment should be both physical and physiological; it is largely physical because osteopathic diagnosis is largely physical. The physical diagnosis is based:

- (a) On the abnormal as compared with the normal architecture of the body. This applies principally to the framework of the body, including the hard and soft structures, tissues, bones, cartilages, muscles and fascia;
- (b) On the abnormal in the principle of mobility compared with normal applied to the mechanism of the body. Mobility is the foundation of all the functional activities and is designed to preserve the integrity of the functioning, through the structure, and
- (c) On the abnormal in irritability as compared with the normal.

From the standpoint of diagnosis and treatment all mobility depends on,

- (a) On the elasticity or rhythmic mobility of the tissues. In the wide sense this applies to all tissues because all tissues are more or less elastic, at least when alive;
- (b) The articulation of one structure with and upon another structure.

This differentiates between tissue mobility and articulation mobility. The former applies to the inherent action or activity of the tissues or organ, the latter to the correlation of one tissue or organ with another tissue or organ.

In diagnosis restrained mobility or limited articulation, increased mobility and increased articulation represent lesions. From the standpoint of treatment the correction of these conditions is what is called for. This distinction is brought out clearly in rheumatism; for example, we distinguish between inflammatory and articular rheumatism. In the former the lesion is one of mobility, in the latter the lesion is one of articulation.

(6) In all treatments the best way to establish normal nutrition is through mobility. In this way we reach circulation and nutrition in one of three ways:

- (a) through muscular or tissue mobility;

- (b) through articular mobility, or
- (c) through the sympathetic mobility in connection with harmonious and antagonistic action. For example, in the groups of muscles the muscles act together or in opposition. This is sometimes called complex mobility. For example, if articular rheumatism settles down in connection with some particular joint there are only two things that can be done from the standpoint of treatment,

(a) to establish elimination for the purpose of removing the deposits, or

(b) to restore free mobility to the joint. If any one of

these two conditions cannot be established the joint becomes ankylosed. Ankylosis, then, is the result (1) of deposit, and (2) of immobility. As long as the mobility is there the stimulation of the articulation mobility can prevent ankylosis. There are two types of ankylosis:

- (a) pseudo-ankylosis, or fibrous ankylosis. In this type there is always a slight ankylosis mobility;
- (b) osseous ankylosis. Here the bone surface is destroyed. Articulation becomes impossible because the articulating surfaces have grown together. In this case there is no mobility.
- (c) In the false ankylosis, the fibrous tissue may later degenerate and destroy the articulating surfaces. In this way the false may pass into the true ankylosis.

(7) The body organism is a self-regulating organism, the

main function of which is to produce heat and energy which furnishes the basic principle of mobility and articulability in connection with organic vitality. This means that animal heat and body temperature and vital energy are fundamental to the vitality of the organism.

This is the reason why abnormal temperature is an index to disease, a sign of change in the organic activities. Hence, next to the articulatory treatment the strongest stimulus to functional activity is in the temperature apparatus, because temperature (heat) apparatus, therefore it is the basis of energy. This is explained by the fact that in the body we find a specific thermic mechanism and it is primarily spinal:

(a) represented by the blood, lymph and the nervous system in general, and the tissues as conducting media of heat and energy distribution;

(b) a specific thermic apparatus consisting of heat centers and fibers that control the production, distribution and dissipation of the heat and energy of the body, centralized in the upper cervical region of the spinal cord;

(c) the muscular system representing the medium for the actual conversion of heat into energy. The energy thus developed is used by the body and its part in the motion and locomotion of the body and its parts and also in maintaining the erect posture of the body.

(8) In the diagnosis of diseased conditions of the body we must always take account of the relations between the body and

its environment. The environment of the body means clothing, temperature, that is outside of the body, climate, food, hygienic conditions of patient, occupation, habits of life, etc. If the environment is abnormal in any particular it requires correction or adjustment in the same way as, although in a different manner, from the other lesions.

(9) In the physical diagnosis from the standpoint of body structure the main point to be attended to is the alignment, or the lack of alignment found in the different parts of the body as a mechanism. This means that the diagnosis of the perfect or imperfect structural integrity is to be based on relations. According to this a bone, muscle, ligament or organ lesion is not a true lesion. The true lesion is,

- (a) the altered relation of bone, muscle, ligament or organ to other bones, muscles, ligaments or organs;
- (b) the altered relation of a bone to a muscular attachment or the articular surfaces of that bone or contiguous bones, or vice versa;
- (c) the altered relation of tissue or cell to other tissues or cells.

This means that a bone lesion pure and simple is an impossibility because of the fact that the body is an organic mechanism and the question is diagnosis, therefore, is whether the mechanical and organic relations are normal or abnormal. In other words, it is not the problem of mechanics alone, but the problem of mechanics plus organic relations. To answer this question calls for a physical examination of the entire body, such as we have outlined in the field of physical diagnosis.

There are several points to be noted here in the theory of the examination of a patient,

- (a) The patient ought to be placed in an easy position, which means either standing, or sitting, or both, at different times. This is the only position in which we can determine the particular relations of structure to structure in the body;
- (b) The best position theoretically for the examination of a patient is with the patient on the face, (with (a), of course, given the first place) with a pillow or some other support under the chest, allowing the chin of the patient to rest on the edge of the table and the head to extend over the table. (Have a straight table). This places the body in complete relaxation and makes the patient as positively and actively passive as possible. In this position the hands ought to lie alongside of the patient on the table in the examination of the spine and the trunk of the body. In the examination of the arms and shoulders allow the arms to fall down along the sides of the table;
- (b) In the examination of the pelvis and the lower extremities, do not place the two feet together on account of the tension that will be thereby produced on the sacral region. Separate the feet about two or three inches and allow them to lie easy on the table.

- (d) Another point along the same line is, do not support the weight of the lower extremities on the toes of the patient, but allow the foot to lie easy on the table. This is the only position in which we can get at the condition of the muscular system, especially in relation to the hip joints.

The above four points are from the theoretical side. Other points are discussed in the field of physical diagnosis.

In the examination of the patient close attention must be given to the spine.

I. THE SUPERFICIAL EXAMINATION. Take two fingers and place one finger on either side of the spinous processes, moving the down slowly from the upper cervical region to the lower dorsal region. Here we are looking for,

- (a) Contraction of the superficial muscles, indicated by muscle hardness, or the cordlike feeling of the muscles;
- (b) abnormal variations in the spinous processes;
- (c) warm or cold spots, indicating variations from normal in the trophicity;
- (d) sensitive, and especially ticklish, conditions at particular points, associated with contractions of the superficial tissues, irritating the superficial nerve terminals.

II. THE DEEP EXAMINATION. This is made in the same way as the superficial examination, with this difference, that strong pressure is applied at each spinous process from the first cervical downward along the spine. Deep pressure is made between the spinous and transverse processes, between the vertebrae and around the heads of the ribs. Here we are looking for,

- (a) contracture of the deep muscles, indicated by deeply seated corded conditions of these muscles;
- (b) sensitive or tender spots found by deep pressure over the transverse processes, indicating anterior or posterior conditions of the vertebrae; also deep pressure between the spinous and transverse processes, indicating anterior or posterior conditions or twisted vertebrae by tenderness.

III. EXAMINATION OF THE SPINE FROM THE ARTICULATION STAND-POINT. Each jointure of the spine has a degree of articular mobility, greater in the upper part and lesser in the lower part of the column. This can be tested

- (a) by semi-flexion of the spine in the same directions—patient sitting, and
- (a) by anterior, posterior and lateral rotation of the body with the patient sitting;
- (c) with the patient on the face, an attempt to move the individual vertebrae by a pull and push movement applied to the spinous processes along with, or in opposition to a pull or push movement of the shoulder or pelvis.

IV. IN THE EXAMINATION OF THE THORAX, (a) the first point of examination is the careful inspection and palpation of the posterior and lateral aspects of the ribs. Lay down the flat of the hand over the ribs, moving up and down lightly, the flat surface of the hand over the rib surface,

- (1) very lightly, to find out if there is any variation from the normal in the flat surface of the thorax, or in the shape and contour of the ribs;
- (2) deeply, to find out if there is tenderness, pain, localized heat or cold. In this case use the cushion part of the fingers, the hand being at an acute angle to the skin surface. Here we are trying to discover
  - (a) if the rib is turned or twisted as a whole in relation to the two points of attachment,
  - (b) using the middle finger at the articulation of the rib with the spine to find out if the rib is turned or twisted at its articulation with the spine;
  - (c) use the same finger between the ribs to find out if the interspaces are normal and if there is any tension (intercostal), manifested by tenderness and pain in the intercostal spaces on pressure.

(b) Next, we attempt to find out the relative condition of the muscles to one another by means of a palpating pressure over the muscles. If the muscle is not normal, it is misplaced up or down and the misplaced muscle will resist if pressure is applied. Sometimes we can find that condition without by simply laying down the flat of the hand over the surface. In this case you will feel the muscle crawling, that is, moving in reaction to pressure. This is always an indication of the misplacement of the muscle.

(c) Next comes the examination of the floating ribs. In this case use the two middle fingers, applying strong pressure on or over the ribs at their articulation with the spine. If the ribs are misplaced in any way the patient will feel pain on applying this pressure. Then examine the floating ribs more carefully by applying a pressure between the head of the rib and the anterior tip of the rib at the same time. This will also cause pain if the rib is abnormal.

(d) The examination of the Scapulae. We must first discover their normal or abnormal relation to the ribs. This is best found by using the finger and thumb, beginning at the lower portion of the scapula and moving the finger and thumb upward while palpating the relation between the scapulae and the ribs. Next examination the relation of the scapulae and the clavicle. The best way to do this is to apply the flat of the hand right over the scapula. Then move the arm upward over the head; let the tips of the fingers go up right over the tip of the scapula to the clavicle; then move the arm up and down, while making the examination as to rigidity, mobility and luxations.

(a) The examination of the limbs. Place the patient on the back or face while making the examination both of the arms and legs. First take the lower extremities. Lift up each limb separate-

ly at right angles, or as nearly that as possible, to the body. Then lay down the limb gently in what ought to be its normal position, with the feet slightly apart. Do the same with the arms, laying them alongside of the body. This position of arms and legs relieves the tension at the shoulder and hip joints. In this position with tension relaxed you can easily detect a shortening or lengthening of the limbs.

(a) Examine the condition of their articulations by the rotatory movements. Do not give forced rotations in this case, because you are not giving a treatment, but making an examination. If there is anything abnormal in the rotation of the arm or limb, the joint will resist, and note (1) point of resistance, (2) the muscular resistance and its degree. Next, examine the arms and legs in flexion and semi-flexion, to discover the degree of flexion possible, (2) resistance to flexion, its direction and degree.

(f) Next examine the head. Relieve the tension that is always more or less present around the lower part of the face, by anterior and posterior flexion of the head and neck, and establish free mobility in the upper part of the head and neck by moving the head gently up and down on the shoulders and neck, and then anterior and posterior, with the patient lying on back relaxed on the table. Then move the head laterally as far as possible to find out if the head articulation on the neck and the neck articulation on the trunk are normal, or if there is resistance, the degree of resistance. Then compare the lateral transverse processes on the two sides by examining with the fingers of each hand along both sides of the neck simultaneously.

(g) Next examine the relation of the sacrum to the rest of the spine and to the pelvis. The best way to make this examination is,

(1) Place the left hand solid over the lower lumbar region, and with the other hand grasp the limb above or over the patella, and move the limb up from and down to the table, with patient on the face. This will indicate

- (a) the degree of freedom of the hip articulation,
- (b) the extent and direction of the movement of the iliac-sacral articulation;
- (c) watch closely the movement of the spine. If the sacral region moves straight upward when you lift up the limb and bring it down, it is normal. If it moves obliquely it is abnormal.

(2) Lift the limb and move it slowly as before. In this case will either get or not get a movement of the coccyx. If there is a slight movement at the coccyx lift the left hand from the lumbar region and place it on the sacrum, applying pressure over the sacrum. This may cause pain, and if so, it indicates an abnormal condition of the sacro-coccygeal, or the sacro-lumbar articulations. Apply the same method of examination to test the two sides.

(3) Place the hand and arm under the patient so as to bind together within the arm the two ilia. With the other hand



pull upward and backward the two limbs (in a large patient one at a time). This movement, if the articulations are normal, ought to show the two sides in the same line. If abnormal, they will move in a slanting direction towards each other, or obliquely away from each other. Also look out, in connection with this movement, for pain. If there is pain on one side, that innominate is moved from its normal position. If there is pain on both sides radiating downward along the ilium anteriorly, this pain indicates something wrong with the symphysis side and not on the sacro-iliac side. There are three points of importance to be noted here,

- (1) ilio-sacral tension is always indicated by pain at the point of tension;
- (2) symphysis tension is always indicated by pain radiating towards the symphysis from the anterior or posterior spines of the ilia; and
- (3) muscular tension in connection with the attachment of the muscles to the ilium, that is, locates the pain around the margin of the ilium, particularly at the anterior superior spine.

(g) The weakest of the spine are (a) in the lumbar region, and (b) in the suboccipital region. An abnormal weakening is indicated by tenderness on pressure at these points.

While the patient is sitting in the natural and easy position, assumed voluntarily by the patient, look for the forward or backward inclination of the spine as a whole. Next stand in front of the patient and palpate for contracted muscles in the back of the neck and in the interscapular region, these contractures indicating when abnormal atrophic conditions of the muscles.

Next rotate the head on the neck and the arms on the trunk to get an indication of tenderness or pain in the muscles attached to the thorax and arms. Apply pressure against the sternum of the patient,

- (1) at the upper part of the sternum; the sterno-clavicular articulation should be raised slightly and brought forward by bringing moving pressure against the sternum. If the movement of the clavicle is inward, it will indicate some abnormality associated with the first rib, first dorsal or sternal displacement.
- (2) In case of manubrium displacement, place the two hands at the lateral curvature, while pressure is still brought against the sternum, of the ribs and palpate each rib for uniformity in position and movements of the corresponding ribs.
- (3) With the same pressure, apply the fingers behind the scapulae, (a) to test the mobility of the scapula; (b) at the angular process of the rib to find whether the ribs are normally flattened or abnormally twisted.

There is a principle laid down sometimes that smooth ribs indicate a smooth spine. That, however, is not absolutely correct.

- (4) Test the mobility of the dorsal vertebrae by placing the fingers at the articulation of the ribs and giving a swaying movement to the patient's body.

- (5) Place the fingers on either side of the lumbar vertebrae, giving a swaying movement to the patient's body in order to find out if the articulations in this lumbar region are normal.

These are the main points in the general examination of the body from the articulation standpoint. At every point in the body palpation is made of articulating structures to determine the degree of normal articulation, or the variation from the normal. A more full statement of the complete examination will be found in the physical diagnosis.

(C) Another conclusion that may be formulated as the result of the previous discussion if the principles is, that the cause of disease is to be traced ultimately to the cell as the unit structure (the structureless unit is bioplasm) of the organism. This is a field that Osteopathy has largely neglected. We have traced and continued to trace the cause of disease to a lesion in the gross anatomy, forgetting that back of this greater lesion (in size) lies, or may lie, another lesion in the minute (microscopic) anatomy. The cells are the storehouses of energy and if the body is alive it has energy. This energy stored up in the cells is liberated:

- (a) <sup>as a reaction</sup> for the purpose of functional activity, and  
 (b) in connection with some form of stimulus.

Hence, all functional activity in the body is determined by and correlative to some form of stimulation. The normal physiological stimulation depends on the mechanical, chemical, thermal, electrical and magnetic conditions that operate together within the body as organic forces. To these stimuli respond,

- (a) the muscle tissues in their normal contraction, changes, and  
 (b) the organic tissues in their rhythmic periodical variations representing the cycle of change of contraction, relaxation and rest.  
 (c) In addition to these, stored up or latent energy produces a certain degree of resistance to stimulation. When stimulation and resistance are normal in degree the resultant activity, whether organic or tissue, is normal. If the activity becomes abnormal,  
 (a) it may be above par. In which case the resistance of latent energy is below normal;  
 (b) it may be below par. In which case the resistance of the latent energy is above normal.

Hence, (a) resistance below par with stimulation normal results in excessive activity; (b) resistance below par with stimulation normal results in lessened activity; (c) resistance normal and stimulation above normal results in excessive activity; and (d) resistance normal and stimulation below normal results in lessened activity.

Hence, the excess of activity results either from lessened resistance or increased stimulation. Lessened activity results either from increased resistance or lessened stimulation.

In regard to the relative values of resistance and stimulation, the former is an inherent characteristic of the cell, the latter is always extra-cellular. The former, however, (resistance) depends upon the extra-cellular to enable it to maintain its normal resisting power. Hence, the two act and react upon each other in the chain of cells and environing conditions, and when the body becomes abnormal in disease this chain, representing the underlying latent forces of the organism, gives rise to the symptomatology of disease.

As the environment of the cells depends on cellular arrangement and relations, because these are the media of realization, all the resistance in the cells practically depends upon such relations as are established structurally between cell and cell. Hence, anything that disassociates cell from cell or interferes in any way with the structural integrity of the cell combinations will tend to lessen the power of resistance and to that extent will weaken the power of reaction or responsiveness within the cells. This opens the way for disease, for example, cancer. Hence, the fundamental proposition of therapeutics must be, how we can establish and keep established the structural integrity of the normal cell combinations. It is here that osteopathic therapeutics differ essentially from all drug therapeutics—drug therapy being based on some form of medicinal stimulus. Osteopathy, on the other hand, does not modify, or attempt to modify, the stimulus, but aims at the correction of the structural integrity of the cells, or groups of cells, in inter-relation to each other, in order to increase the power of resistance and, consequently, the power of responsiveness to normal stimulation. We build up the resistance. Drug therapy gives the stimulus, for example, structural changes in the lower dorsal region may result in a lessened resistance of the cells forming the contractile and secretory tissues of the intestines, and so the result is diarrhoea, or constipation.

(1) Medicinal therapeutics would add to or take from the stimulation present so as to make the contractile and secretory tissues more or less active.

(2) Osteopathic therapeutics corrects the structural changes in the lower dorsal region and thereby increases the resistance of the cells of the contractile and secretory tissue in the intestines and thus corrects diarrhoea and constipation without any modification of stimulus.

Structural changes produce (a) lessened resistance in the combination of cells, and (b) a resultant modification of activity. Structural changes here means a change involving any grouping or combination of cells, that is, it may be a change in the tissue, or one tissue in relation to another tissue, or it may be a change in adjustment of bones and ligaments in and along the spinal column. Not only a crude lesion but also a microscopic change—change in the relation of cell to cell. (Von Gieson.) These structural changes produce:

- (a) Lessened resistance in the combination of cells, for example, in organ disturbances like the liver, where the liver consists of a combination of cells, a structural change will result in lessened resistance of the liver as an organ;

- (b) This in turn makes it possible for increased stimulation to liberate additional energy and to produce increased activity. For example, increased heart action as a result of the previous liver condition. There is the liberation of a greater amount of energy in the cell substance of the heart, with the result that the heart is increased in its action;
- (c) Even normal stimuli, and sometimes stimuli weaker than normal, may operate to increase physiological activity because of the lessened resistance due to the structural defect. This tendency to increase the physiological activities lies at the foundation of all acute disease processes and of all malignant processes and of all cases of toxemia or poisoning, for example, inflammation in the spine, etc. If germs have any place in disease this is the place they belong.
- (d) This condition of lessened cell resistance makes possible the invasion of the system or its tissues by germs, the improper reaction of the tissues to climatic and unhygienic conditions and tendency to exhaustion as the resultant of the over activity in the groups of cells, as in neurasthenia.

If these biological principles are true, then we must go to the component <sup>cellion</sup> of the cell for the ultimate etiology. In the composition of the cells we find by analysis a mass of complex molecules whose atoms are loosely combined. The whole mass of crude chemical materials, therefore, is held together by the affinity of the molecules, according to physics, and physics is just of true of the living body as it is of a mass of rock. Molecular affinity, however, is based on atomic tension and this atomic tension is kept up by the supply of materials furnished through the lymphatic circulation. Therefore this atomic tension is the basis of all cell resistance. To maintain this cell resistance,

- (a) State of integrity of the cell and between cells, or the groups of cells;
- (b) The cells must receive the proper amount and kind of nutriment through the blood and lymph;
- (c) The materials furnished must be in such form that they can be assimilated without extra effort on the part of the cells. Hence, the lack of the proper materials and changes in the circulating fluids may modify the resistance so that with the continuance of normal stimulation and, even with weakened stimulation, the results are,
- (1) exhaustion may result from the continued liberation of energy, or,
  - (2) before the exhaustion takes place (exhaustion representing the inhibition of functional activity) an over-active condition of the functioning may take place, and this may result in the destruction or death of the organism before cell resistance can assert itself by exhaustion.

This explains, for example, the hypersecretion found in secretory structures, the contracture of muscular structures and the overactivity of rhythmic organs, as stages in the development of de-

pletion and exhaustion.

This means that in the osteopathic field therapeutics is designed to promote the increase of the resisting power or powers of the organism or its constituent cells. That is the principle of osteopathic therapeutics. The next question is as to the method:

- (1) Palliation, by modifying the altered resistance or stimulation. This is the only field in which we can take in the field of stimulation in therapeutics. Here the methods of inhibition and stimulation (acceleration) are effectively used. Also antiseptics, (germicidal action) antidotal and hygienic measures to remove or modify the external stimuli. That these measures are osteopathic is demonstrated by the fact that the conditions aimed at, that is, to be removed, are obstructive interference, or irritations that modify or tend to modify the activities of the structural elements;
- (2) The great work of osteopathic therapeutics is corrective, viz: to correct the structure so as to normalize:
  - (a) the correlations of individual cells and their combinations (tissues), (minute microscopic anatomy and the crude anatomy);
  - (b) the correlation of cell resistance and stimulation both from the nutritive side and the external environment side.

This corrective field properly includes anatomical adjustment and the physical adjustment of the forces and the environment of nature in so far as this is possible, to aid in relieving obstructions to vital expressions.

- (3) One field of the osteopathic work that must not be overlooked is that of elimination (in the wide sense). Medical writers regard germs, uric acid, etc. as causes of disease. Osteopathically we regard these as products, that appear on the surface of the tissues as a result of certain abnormal processes that take place during the life history of disease. The real cause of these products lies deeper in the structural changes that produce a lessened resistance to normal stimulation. This lessened resistance depends on,
  - (a) some modification of the nerve forces that operate through the cells, or
  - (b) an alteration of the lymphatic circulation which furnishes the cells with fluid medium;
  - (c) some change, or changes, in the blood circulation, that normally unites the life giving elements of the food and air, or oxygen, with the nervous forces to produce assimilation, some of these changes, operating in all cases or conditions of disease to alter the resisting power of the organism,
    - (a) of the individual cells; and
    - (b) of the groups of cells.

The result is that stimulation acts on the cells in such a way that it produces degeneration or disintegration with resultant exhaustion. (Neurasthenia, neurosis.) Elimination is absolutely essential if these products of the disease processes are to be prevented from re-

remaining in the cells and acting as causes of further degeneration, disintegration and exhaustion. If the abnormal products that remain in the cell or cells of this abnormal type may cause the liberation of nerve energy produced in an endless chain until complete exhaustion takes place. Hence, as a means of protecting the organism from still further depletion, even in certain cases if cure is impossible, or until cure is possible, elimination can take place through the organs of elimination. This is the case, for example, in Bright's Disease, Diabetes, Rheumatism, Gout, Syphilis, Gonorrhoea, Cancer, Tuberculosis and probably some others.

In addition, whenever such products form combinations with the complex molecules of the cell bioplasm, so that every metabolic process that takes place is vitiated by these toxic products or elements; in this case when the elimination cannot take place without first separating these products, or the resultant products, <sup>from</sup> the cell bioplasm, it may be necessary to use antidotal means in order to make elimination possible. The necessity for such antidotal means depends on the fact that in this case elimination is impossible until the combination between the toxic element and the bioplasmic element is broken up.

The claim is made by some that to replenish the tissues by nutrition would result in the elimination of the toxic elements. This, however, is untrue, because in the reconstruction process, even when nutrition is perfect, nutritive reconstruction takes place on the vitiated basis, when the vitiation has reached the bioplasmic field. The question arises here, how is the lowered resistance that we deal with osteopathically in all diseased, produced?

(1st) By some structural deviation, involving a tissue, or tissues, of the body. (A group of cells.) Especially those tissues that lie in closest relation to the distribution of the nerve force and the blood. This is the reason why the malnutrition comes in as an essential factor in disease, for example, the vertebrae, the ribs, the muscles and the ligaments modify the nutritive condition of some organic or tissue structure lowering resistance until germs, toxins, sepsis, etc. find a lodgement in a favorable culture field.

In other cases the point of lessened resistance becomes a dumping ground for poisonous wastes from other body processes. To meet these processes, nature may attempt,

(a) to eliminate from the body by the normal channels and may either fail or succeed; or

(b) to compensate for the failure or the abnormal state of the processes developed, nature placing the burden of the activity upon some stronger organ or tissue structure. In this case there is a balancing of the weaker and the stronger for the purpose of maintaining the general balance of tissues and organs necessary to life, for example, hypertrophy of the heart; or

(c) to accommodate the part affected by the change in the system to the new conditions established in connection with the process, for example, by walling off a diseased area, as in a carbuncle, or tuberculous tubercle, encysting or encapsulating the disease producer (germ).

(2nd) We must not forget that lessened resistance sometimes results from an increase or decrease of the normal stimulation. Here over activity such as over indulgence of any kind from the process side may result in a change in the structure, producing lesions, that in turn interfere with, as well as lessen, resistance.

Here the structural change or lesion is not the primary etiological condition, but the condition that sustains or maintains the lessened resistance. In this case changes in the tissues, including vertebrae, ribs, muscles and ligaments are the result of changes in the processes, organic or bodily.

In this case we have to deal with a double lesion, a structural and a functional lesion. The change in structure is perhaps more important because it operates more generally, interfering with the distribution of nerve energy and the fluids of the body. This change of structure that we call a lesion, represents a change in the alignment of bones, muscles or ligaments in the makeup of the body framework. The effect of this altered adjustment is the irritation, obstruction, interference with, or pressure upon something that normally has to do with the distribution of the nerve energy, the nutritive and eliminative fluids. The effects of lessened resistance are varied:

- (a) when the lesion affects a nerve fiber, or nerve trunk, the effect is mechanical stimulation, inhibition or irritation;
  - (b) when the lesion affects the circulating fluids it may manifest itself in one of three forms:
    - (1st) in the interrupted, stagnant or static fluid condition, or
    - .....(2nd) in the chemical stimulation or inhibition of the minute nerve endings in the tissues,
    - .....(3rd) in modified metabolism and resultant modified nutritive conditions; or
- No. 1 represents a physical condition,  
 No. 2 " " physiological condition, and  
 No. 3 " " chemical condition.

In considering the subject of diagnosis and treatment, we must not forget that the tissues are to be classified as structural and vital tissues. The basis of the structure and between a structural and functional lesion. The structural tissues include and represent:

- 1st: Those tissues that give form, structure and stability to the organism, including connective tissue, ligament, bone, tendon and fascia;
- 2nd: tissues that tend, or help to enable the structural

tissues to unite in different forms of activity. Viz: the muscles, and the elastic tissue (yellow elastic). And here we have the tissues that are not purely structural, but are structural plus the factor of vital activity.

Among the vital tissues we classify:

- (1st) the blood as a tissue, including the lymph as a fluid that tends to unite all other tissues in the active vital processes;
- (2nd) metabolic tissues that exercise their cellular (glandular) powers in the preparation of nutrition and internal secretion and the elimination of waste. These include the glands, membranes and the skin;
- (3rd) the nerve tissues that possess in the highest degree, as the originator of bioplasm and the cerebro-spinal fluid, the means of establishing perfect communication among the tissues of the body, perfect trophicity in the tissues and organic completeness of the entire mechanism.

From the diagnostic side we emphasize these points:

- (1st) the adjustment of the structural tissues may be modified;
- (2nd) as these structural tissues are everywhere surrounded by the vital tissues, every maladjustment of the structural implies pressure upon, irritation to, or obstruction of the vital tissues. This results in obstructed or irritated vitality.

Resulting from this original maladjustment and the secondary irritation or obstruction we find: The reaction from structural irritation on the vital tissue is on the field of co-ordination.

- (3rd) a condition marked by interference with, or modification of:
  - (a) the media of interchange, viz: the fluids of the body;
  - (b) the media of intercommunication, viz. the nervous system.

Resulting from these interferences, we find

- (4th) a series of changes, viz. disturbances in the characteristic functional processes, viz. the reaction of this altered co-ordination is on some one or more of the vital processes, disturbed metabolism, secretion, excretion, circulation, etc.

As a lesion represents, primarily, any alteration in the ~~adjustment of structural elements~~ adjustment of structural elements, including the tissues, organs and cells:

- (1) the primary condition may relate to the structural tissues, that is, the bones, the ligaments, the cartilages, the tendons and the connective tissue, tissue relations;
- (2) the failure to adjust may originate from derangement in the activity of the contractile tissues, viz. muscle and nerve, both being involved in the modified



contractility, because no muscle exists that does not have a nerve supply. Here the primary condition is under- or over- activity on the vital side. It means from the lesion standpoint a physical condition or change in the molecular field. In this case the structural tissue lesions are secondary;

- (3) the result in either of the above cases is an interference with, or obstruction to the blood supply and irritation of, or pressure on the nerve supply in either of these cases, producing an altered metabolism, incoordination in the blood distribution, inequality in nerve force distribution and a weakening of the tissue or tissues corresponding with the state of malnutrition- malassimilation;
- (4) This malnutrition may result in the deposit of poison, the accumulation of wastes and the development of germs by infection and by culture; the lessened resistance of the structural and vital tissues making it possible for abnormal physical, physiological and chemical processes to take place and to produce death disease and death.

These are the four points that represent what we call the history of a lesion.

A lesion, then, as defined, represents any change in the structural adjustment, gross or microscopic, or physical, that affects or modifies functional activity to the detriment of a vital process or the vital activity of the organism.

As the vital processes are closely associated with the fluids of the body as media of interchange and the nervous systems as media of intercommunication, the main irritating and obstructing lesions are lesions that affect the blood, lymph and nerve supply. This is the reason why most of the lesions apply principally to the field of the muscles, ligaments and bones, although they may involve any tissue. Such lesions are characterized by

- (a) a perceptible disturbance of relation or association between structure and function, or vice versa.
- (b) anaesthesia or hyperaesthesia in the localized area of reflexes controlled from the point of derangement, that is, the skin, the muscle, the fascia;
- (c) palpable deviation from the normal in the case of the gross lesion, or ~~physical~~ superficial expression on some surface plane in the case of the microscopic and physical lesion, on the basis of Hilton's and Head's Laws.

According to Hilton, "The same trunks of nerves, whose branches supply the groups of muscles moving a joint, furnish also a distribution of nerves to the skin over the insertion of the same muscles and the interior of the joint receives its nerves from the same source."

Here we have the principle of tissue correlation plus the harmonious action of tissues on the basis of mobility and articulation through the medium of nervous intercommunication. This secures physical and physiological harmony between the motive power in the

muscles and the vital capacity of the parts moved in connection with articulations, preserving a balance between force in the tissues and vital endurance through the nervous system.

This principle is applicable to all articulations and also to the movements of the tissues upon and in relation to each other. It explains the therapeutic value of an articulatory treatment from the corrective side. Osteopaths in general have laid stress on the idea of correction, forgetting that it is not correction that is the principle, but that correction is the method of getting at the principle, which is articulation. Provision is made according to this law for the superficial expression of deep seated workings of the tissues in connection with the form and degree of nerve activity, so that wherever afferent and efferent nerve distribution takes place there we have an anatomical law that can be applied without fail.

Head's Law, on the other hand, is a physiological law, relating to the transfer of a pain stimulus from its point of origin to some point of conscious sensation. Wherever a close central connection is established between two points, there is the point of registering sensibility and with the complete segmental distribution of the thirty-one pairs of spinal nerves and the segmental cranial nerves, this sensitive registration covers the entire field of the body. The law of Head is the basis of all the correlations based on the reflexes which lie at the foundation of pain, sensitiveness, tenderness and irritation. That is, Head's Law is the physiological basis of the entire field of symptomatology, as Hilton's law is the basis of the entire field of etiology, that is, the basis of disease.

The osteopathic centers already discussed, make this law of special value both in diagnosis and treatment. The application of this law is either corrective, or in connection with some modification of activity by stimulation or inhibition.

### S Y M P T O M A T O L O G Y .

Symptomatology, as it finds its place in the fields of diagnosis and treatment in the other schools of medicine, is valuable chiefly because this is the only means they have of getting a picture of the disease, or the diseased patient. Their diagnostic value, therefore, has determined the classification of disease according to the tissues or organs predominant in particular diseases, that is, disease has been classified by the writers from the physiological standpoint while they have treated the diseases from the pathological standpoint. Osteopathically, we claim the right to classify disease from the side of etiology, that is, the standpoint of the physical and anatomical law, using the physiological law in symptomatology as the basis of our differential diagnosis.

To the Osteopath symptoms are of lesser importance, but they must not be entirely set aside because, while we consider the symptoms that appear in connection with tissues and organs as the expression of a deeper cause in relation to the nerve and blood disturbance, the symptoms are often valuable as a means of getting at the history of the development of the disease, the stage of development at which the patient has arrived and the possibility of

palliation.

Functional disturbances imply a changed circulation and an altered nerve distribution. In the blood circulation and in the nerve force lies the power of complete reaction, if reaction is possible. In this way disturbed functioning must be overborn. If it cannot, then, functioning is disturbed by perversion— increase or decrease of functioning and corresponding with these changes we find reactive changes of the circulation and in the nerve distribution that give rise to symptoms.

Symptoms, therefore, in a case always represent reactionary changes in the functioning of the organs or tissues that are involved, either an increase or decrease in functioning plus signs of obstruction, irritation or pressure. Symptomatology, therefore, implies a change from the normal (the normal being the balanced condition of the nervous and circulatory systems) to the abnormal, which represents the unbalanced condition of some system in relation to some other system in the body— the nervous and circulatory systems. That is, all symptomatology has relation to these two systems, circulation and nervous system. These are corrected as a means of balancing the physiological law in the field of the organism. Symptoms are, therefore, disturbed functions, altered circulation, nerve action, secretion and excretion.

As the nervous system is the ultimate controlling factor in the organism, the unbalance may be ultimately traced always to the nervous system. This nervous system being the controlling factor in all functioning, it may express reactionary changes (symptomatology) by;

(1st) signs of disturbances in its own functionings. Its functional activity being proportioned to the measure of its blood circulation;

(2nd) reflex signs expressive of disturbances in other systems, organs and tissues. Hence, a diseased condition in any part of the body may be traceable to, that is, a reflex may be found:

- (a) a change in circulation in some part of the nervous system. This explains why vaso-motion is such an important factor in connection with disease, most symptoms being vaso-motor;
- (b) A disturbed circulatory condition in the nervous system may be expressive of an altered condition in some tissue or organ. Hence, every symptom is either of a nervous type, or of a nervous plus a circulatory type. Therefore, all symptoms may be classified under two heads,
  - (1) Symptoms of a purely nervous type.
  - (2) Symptoms of a nervous type plus circulatory.

This means that to interpret symptomatology in the right way, we must discover:

- (1) the part of the nervous system, of the part of the blood system, or both, that is involved;
- (2) how and in what way the pathways of exchange and communication between the nervous system and the blood are interfered with or obstructed; and

- (3) trace out the way, or ways, in which these particular involvements produce body reactions.

A particular type of obstructions, irritation or interference always calls forth the struggle of nature to overcome it. The attempt of nature to overcome this abnormal condition reduces itself to an attempt:

(a) to checkmate or stop the particular disturbance by some process of elimination or excretion. This explains why eruptions on the surface of the body and eliminations from the excretory channels are so frequent in the early stages of symptomatology. This explains the relation of rashes, eruptions and eliminations to the structural lesions. In many cases nature is successful in aborting the disease by the checkmating process. Our work is to aid nature in this abortion process in dealing with the so-called infectious diseases;

(b) nature attempts to compensate for the disturbance by throwing the burden of activity upon some other tissue or organ. Here the principle substitution occupies an important place in the field of symptomatology. That is, one type of activity for another type of activity, and this substitution follows the line of least resistance. Hahnemann taught us from center to circumference;

(c) Nature attempts to accommodate the organism to the disturbed condition by so protecting the organism outside of the disturbed field, or by isolating the disturbed field so that the organism is willing to surrender a part of itself to maintain the entirety of the organism and also that the organism may surrender a vital process to preserve the integrity of organic life. The meaning of this is that nature's ultimate measure of protection is to preserve and protect the vital tissues at the expense of the structural tissues. This is illustrated by the walling off of a disturbed area so as to cut off that area from the physiological activity of the rest of the body, as abscess, for example.

This explains from the therapeutic side:

(1) Why general constitutional treatment is of value in palliating symptoms and aiding the organism to do the work of attempting to overbear the disturbed conditions?

(2) Why the articulation of the spine is always an aid, if not an essential factor in the cure of every disease, because articulation is the most effective treatment we have outside of the correction of the specific lesions, to combat and control congestive and static conditions of the circulation?

Superficial symptoms in many cases, especially in the acute diseases, are due entirely to deficient circulation and this can be corrected only by articulation.

(3) Why treatment to equalize the circulation of the blood in the body, or between the pulmonary and systemic fields, or between the thoracic and abdominal fields, or between the abdominal and pelvic fields is of much value in connection with the aggravated and intense symptoms of acute diseases? This is true, for example, in pneumonia; to equalize and keep equalized, the circulation of the blood between the thorax and the rest of the body is absolutely all that is necessary to cure a case of pneumonia.

(4) Why treatment to equalize the nerve force in its dis-

tribution between the two nervous systems, or in its regional distribution is one of the most effective means of making the patient reactive to corrective work, to hygienic and dietetic measures in the course of the treatment of the acute diseases?

(5) Why circulatory treatment to increase the blood and the lymph circulation and make it more rich in its formative elements is the best treatment in the case of the infectious and contagious diseases where germs and their toxins appear in the malnutritive fields of the body?

In line with this idea Mancrede in his "Principles of Surgery", page 66, states:

"Observers have extracted certain substances (defensive proteids) from the livers and spleens of animals capable of destroying bacteria. These are never found in normal blood, but when the febrile state has supervened these substances in active state are detectable in the circulating blood."

According to this when the febrile state is established, to increase the formative elements of the blood is the rational treatment of all the infectious and contagious diseases.

Nature accordingly has a native power of accommodation or compensation to functional and structural changes. Certain cells and groups of cells have the power of increasing their activity to compensate for decreased activity elsewhere. They have also the capacity of altering their alignment and even modifying their structure to accommodate to the functional or structural changes in other parts. This is best illustrated in the irregularities of the spine and in spinal compensatory curvatures in order to sustain the body in the erect posture. In spinal curvatures compensatory to hip or pelvic conditions, accommodating the central gravity line of the body to the organized mechanism.

An important question in therapeutics here arises: Is it correct always to undo this work of compensation by correcting these irregularities and curvatures, and, if so, how should it be done?

The cells and groups of cells in the body have the power of accommodating themselves to very marked changes in structural alignment and in certain cases cells or groups of cells altogether different from those engaged in any particular function may take up this function by compensation or accommodation when for any reason the function fails.

To answer this question we must consider the results that follow from the work of undoing, that is, from the correction of the compensatory conditions, for example, in tubercular cases, or in deformed results of Pott's Disease and in similar cases, to undo the compensation is contrae indicated therapeutically.

In the general case where one curvature laterally compensates for another lateral curvature, or where spinal curvatures compensate for hip or pelvic conditions the work of compensation done by nature to checkmate some abnormal condition must be undone before the real correction can take place. In this case the secondary condition must be removed before the primary can be dealt with.

In the case of compensation and accomodation taking place by the formation of new tissues the modification must take place by nature, that is, the absorption of the new tissue must take place as a result of:

- (a) Corrective treatment;
- (b) Co-ordinative treatment;

The absorption will take place in this case if nature is given a chance.

As the spine is the prigin, or the seat of expression of all diseases, spinal curvatures, lesser or greater, and irregularities of the spine, which are really the beginning of curvatures, appear in nearly every case as compensatory conditions. The reason of this is that the spine in its adjustment protects the spinal cord and through the rib and muscle attachments protects the internal organs and by means of the neck muscles and ligaments supports the cranium and its contents free from disturbances. The fact that the spine continues flexible in connection with rotation, flexion and extension makes it possible for the spine to become the medium of transforming mechanical articulation into physiological stimulation thus furnishing the basis for the physiological activities. For this reason the spine normally is of the greatest value to the body functionings and when the body becomes diseased the spine is:

- (a) the point at which the expression of the disease becomes most apparant; and
- (b) the spine can be used most effectively in connection with the correction of these conditions.

In dealing with these irregularities and crivatures of the spine, we require to contract the typical surgical method and the typical osteopathic method, in order to appreciate the distinction between the two methods and to emphasize the value and importance of osteopathic technique

(A) The typical surgical method is probably the best for our purpose, expressed by Dr. C. E. Keppler, of New York, as follows:

"The basic principle upon which we generally work is overcoming deformity, viz: active correction and passive retention in the corrected position, is here beset with difficulties on account of the complicated construction and manifold functions of the spinal column. Retention in the corrected attitude (by means of apparatus) without practical immobilization is impossible and thus we lose the adjuvant of motion as a further corrective factory. Again, the correction itself is quite difficult owing to the fact that we cannot apply our forces directly upon the twisted, frequently deformed vertebrae, but must endeavor to bring about the curative effect by ibcreasing the local and general muscular power, by reducing the harmful influence of the continually active superincumbent weight of the head and shoulders, through stretching and the assumption of the recumbent position and by applying our corrective apparatus to the parts in close proximity to the deviation. From this it is apparent that the earlier we recognize and systematically treat lateral curvature the more hopeful may our prognosis be." ("American Journal of Surgery", January, 1907.")

According to this:

(a) The suspension of all physiological conditions, such as mobility, the action of the muscles and the soft tissues and the application of the principle of physical immobilization to the body as if it were a piece of dead anatomy;

(b) the fundamental surgical principle is that of mechanical correction by means of the use of apparatus; also suspending physiological conditions of the body and applying pure and simple physics.

According to Kepplar, mechanical apparatus-correction is not to begin until active exercises have ceased. (Purely passive.) The object of that is to secure absolute rest to the muscles and at the same time to reduce the possibility of deformity by over-exercise.

(c) In addition to the mechanical apparatus for immobilization he recommends the use of an inclined plane. This consists of a board, six feet by two feet, tilted at an angle of 45 degrees, at the upper end of which are attachments to which the head-gear of the apparatus is attached, the head itself being freely suspended by means of a hole in the board. The child is laid out on this board, suspended or hooked from the head-gear, kept lying on the board from 15 to 30 minutes at a time, entirely suspended from the head-gear attachment, the arms and limbs being free. According to Keppler, the weight of the body tends to extend and straighten the spine, the flatness of the board pressing on the irregularities of the spine and tending by the solidity of the structure to correct these irregularities.

(d) In the case of spinal rigidity, he uses two modifications:

(1) A padded drum is fastened between the uprights so that it can be elevated or lowered along the side of the shaft. This is used in two ways:

(a) the operator stands behind, grasps the patient-standing against the drum- under the axillae and pulls patient over the drum so as to place the point of greatest irregularity immediately over the drum;

(b) according to the other method, the child is taught to bend back voluntarily over the drum.

(2) The child is placed on a sliding seat, fixed in a large frame, the feet just resting on the ground. The pelvis and hips are firmly strapped to the seat and the shoulders are held in fixation also by the straps. The headgear is put in position in relation to its hooks. The head of the patient on the concave side grasps the structure of the head-gear, by a rope and pulley apparatus, and traction is brought to bear upon the head, this extending the spine from the head and neck. Over the ribs that are bulging a cushioned steel pad is fixed and this is drawn strongly against the ribs also by a pulley arrangement, when the maximum of tension and traction are secured by this apparatus. Patient remains five or ten minutes in that maximum of tension and traction position and that amount of pressure and tension is increased from day to day as the corrective work takes place. In other words, this is, as before, pure physics.

The osteopathic position is best brought out by a few critical observations upon the surgical methods of Keppler:

(a) The use of these apparatus, according to the osteopathic principle, would really be more harmful than beneficial, because the principle on which they are based is both physiologically and anatomically incorrect. At best there is but one class of cases in which such apparatus might be serviceable, viz. in curvatures due to excessive relaxation of all the muscles of the spine, but in this case a moderate stretching of the spine periodically, together with keeping the patient in the recumbent position the greater part of the time, would be more serviceable, and therefore in line with the physiological physics of mobility.

The principle in this case is to relieve the spine of weight from above and support from below in order to relieve the muscles of all tension (possible) in their atonic state.

(b) The suspension of the physiological conditions in the treatment of the body is always detrimental, therefore these physiological conditions are the basis of organic as well as visceral life and if the conditions are suspended the organic and visceral life must be injured.

(c) In addition to these, patients are nearly always children of a rickety, or neurotic constitution and the best treatment is an upbuilding treatment to nourish and strengthen the spinal muscles. In such cases the maximum of nutrition and the minimum of correction ought to be the rule, side by side.

(d) In the other cases of curvatures muscles and ligaments are enlarged and hardened generally along one side of the spine in direct relation to the curvature. This muscle and ligament enlargement is a compensation to prevent, as far as possible, on the part of nature the maximum of deformity. In this case the muscles and ligaments are more rigid in the area of curvature so that to apply fixed apparatus the normal portion of the spine would be the parts stretched while the abnormal parts would be hardly altered at all.

(e) In addition to this the spine is a gradually increasing structure from above downward, each vertebra increasing in size and weight in comparison with the vertebra above. The same thing is true of muscles and ligaments. The result is that movement is at its maximum in the cervical region, mobility here being greater than strength. The greatest mobility relatively is at the articulation of the atlas and axis and consequently this is a very weak part of the spine. For this reason enlargement and rigidity of the muscles and ligaments is found at this point on account of the exaggeration of mobility in the previous history of the case.

As we go down the spine there is a decrease of mobility and an increase of strength so that in the middle of the dorsal region the spine is very immobile, compared with the cervical region, and the strength of the ligamentous articulations is great.

In the lower dorsal and lumbar regions the mobility is still less and the strength is still greater, consequently to apply apparatus to stretch from the head, or from the neck, with sufficient force to stretch the mid-dorsal or a dotso-lumbar curvature would



damage the structures in the neck. No one can invent a purely physical apparatus that will graduate the tension to be applied to these.

(f) Another method of correction used in the surgical field is what is called passive correction. The method adopted here is to correct the deformity as much as possible with or without anaesthetic and then apply a rigid Plaster of Paris jacket. This is the Lorenz method. The rigid jacket is kept in position for several weeks, and if the deformity is not corrected by the first jacket it is renewed. This method is equally detrimental, therefore it establishes absolute immobility.

Various mechanical apparatus have been used to correct the deformity of the spine as much as possible before the application of the jacket. The jacket is applied to the body trunk, extending from the axilla to the pelvis. In some cases head and shoulder pieces are attached, and in others, pelvis and hip attachments are added to increase the support.

(g) The real principle here is: (a) to correct by force passively; and (b) actively to correct by retaining in the apparatus. This retentive apparatus may be of two kinds:

- (a) ambulatory; the apparatus is applied in this case in the form of braces, corsets, casts, etc., the apparatus being firmly placed in relation to the shape of the body as possible. When thus placed it is retained by the patient in his movements and locomotion;
- (b) recumbent apparatus; here we have certain apparatus called frames used particularly in cases of rickets, the patient being placed in bed and kept continually recumbent while the straightening process goes on.
- (c) Another recumbent apparatus that is used is the Plaster of Paris corset in which the posterior part of the trunk is encased while the child lies in extension. It is then added and strapped to the trunk, shoulders, and pelvis. The patient lies continually while this apparatus is supposed to exert a passive corrective force.

These methods are mentioned for the purpose of stating that they are unosteopathic. The best that can be said for them is that they keep the spine in a better state of extension and adjustment from the standpoint of the bony framework.

Osteopathically, success in correcting curvatures depends on:

- (a) The extensile and elastic power of the muscles, depending upon mobility, and
- (b) the articulatory power of the ligaments in relation to contiguous structures. It is only when these two principles of mobility and articulation are properly used in the work of adjustment that the bones can be forced to assume their proper position and relation to one another, and the soft tissues properly adjusted to one another and to the framework. This cannot be

done if the muscles are kept firmly enclosed in a solid cast or frame. Some of the Medical Colleges teach the Brunning Method.

Dr. Keppler, whom we quoted before, says:

"Retention in the corrected attitude without practical immobilization is impossible and thus we lose the adjuvant of motion as a further corrective factor."

This states as clearly as the osteopathic principle could state the standing objection to the surgical method by the osteopathic system; that the use of apparatus of any kind to force immobilization is unphysiological and consequently unscientific.

Muscular capacity cannot be increased without exercise and the toning up of the tissues is an active process, not an immobile or passive condition. The only case in which immobilization would be indicated, according to the osteopathic principle, is in a case of tuberculosis involving the spinal vertebrae, or in Pott's disease following tubercular necrosis, or in congenital dislocation to retain in absolute articular fixation. In these cases immobilization to produce ankylosis or articular immobility is used as a means of throwing the part affected into a state of quiescence, so as to prevent any further deformity. But, even here the immobilization takes place for the purpose of uniting anatomically separate structures so as to compel them to function physiologically together instead of separately and for the purpose of preventing further development and extension of the tubercular infection. In other words, it is compensatory to the condition of the patient constitutionally from the tubercular standpoint.

(B) The typical osteopathic procedure; as compared with the surgical:

General surgery has taken no account of the cause or causes that produce curvatures or irregularities of the spine. For this reason osteopathic surgery is based on an entirely different principle, viz. the removal of the cause either producing or maintaining or leading up to the condition represented by the curvature. This is the only rational method of treatment, because so long as the cause remains, curvature or irregularity, while it may be temporarily corrected, will subsequently return.

The primary treatment, then, from the osteopathic standpoint is the removal of the cause producing or maintaining the curvature; the after treatment aims at correcting the deformity, but this is secondary (purely) from the standpoint of the application of the osteopathic principle. This is the relation of the subject.

The spine, as we have found in the early part of the course, consists of twenty-four separate vertebrae, articulating on each other by means of ligaments and muscles. The general spinal form and shape is maintained by these ligaments and muscles. Therefore, the articulation of the spinal column as a whole, in connection with motion and locomotion, is dependent on the action of the muscles and the reaction of the ligaments.

The muscles are attached to the vertebrae in two sets, each muscle on one side of the spine being an antagonist to a similar muscle on the other side, giving us the antagonism of muscle

action as a bilateral condition. This explains the great frequency of lateral curvature or displacement. If these muscles are normal bilaterally there is an equal tension on both sides of the spine, the one side being exactly equal to the other, <sup>in tension</sup> ~~in tension~~: This tension causes one side to pull against the other muscularly so as to stimulate the reactive force of the ligaments that bind the bones together; this double action of bilateral muscle antagonism and bilateral ligament antagonism maintains the normal form of the spine. Any disturbance involving one set of muscles, therefore, diminishes the tone of the entire muscle field, and the result is that the vertebrae fall out of alignment secondary to the muscle and ligament conditions; for these reasons there is present, in any given lesion,

- (1) inequality of tension in muscles; and
- (2) loss of tone in the soft tissues generally;
- (3) lack of muscular antagonism; and
- (4) lack of ligamentous reaction to muscle antagonism, because of the change of tone in the muscles as the result of some irritation or interference transmitted spinalward by the nervous system. As illustrative of this, gastric irritation, indigestion, intestinal derangement, abuse of any of the organs causes a reflex spinal irritation and this irritation reacts upon the muscles and ligaments, producing spinal irregularity or curvature.

Toxic or rheumatic conditions also stimulate spinal irritation. The spinal irritation is always expressed by the spinal congestion, the index of which is tenderness along the spine. This tenderness reacts along or upon the spinal muscles, in such a way as to force a change of tone, with the result that the ligaments become rigid and spinal curvature follows. The type of rigidity depends on the cause. There are two types: contracture and tetanus. In some cases constitutional conditions, such as rickets, catarrh, the toxemias, diseases of nutrition lay the foundation for muscular weakness. Following these the attitude of the spine, based primarily on neurotism, secondarily on occupation, especially in neurotic children and in those of sedentary habits, or following some particular occupation in which the arms or limbs are in excessive use, or in which the trunk of the body is kept rigid, predisposes to localize the irritation at a particular point in the spine.

#1. The first thing to be done in the treatment of such conditions is the removal of the cause of the spinal irritation; and this has to do with TOXICOSIS, neurotism, mechanical lesions, or the individual attitude or occupation. This condition must be corrected from the dietetic side, or hygienic standpoint. When the nutrition is involved there is the lack of ability to transform food into tissues and in this case the general nutritive processes in the body require to be attended to;

#2. In many cases the cause, at least, of the localization of a spinal curvature or irregularity is traumatism. The most frequent form of traumatism is a sprain or strain resulting from over-action, such as a slip, etc. (See Moullin on Sprains.) The result of the sprain or strain is a localized inflammation, with accumulation of deposits that involve the cartilage, muscle and the

nerve centers in the local area. In some cases the first reaction is the weakening of an organ, and then the resultant secondary reaction is the relaxation of the spinal muscles in the area of the organ involved. In this case the primary inflammation and the secondary reaction upon the organ and spinal muscles must be dealt with, either from the organ standpoint, or from the blood standpoint.

#3. Professional or occupational curvatures or irregularities<sup>grs</sup> found in children attending school, due to the child's method of sitting, plus constitutional weakness. In some cases the one shoulder is elevated above the level of the other and the spine springs toward the desk at which the child sits. When this false position is kept up for some years the spine ultimately assumes a marked curvature.

Similar curvatures are found in nurses, particularly due to the use of one side of the body and the practical non-use of the other side of the body.

Similar curvatures are found also in typewriter operators. In this case the curvature is more of a lateral rotation above the level of the 9th and 10th dorsal vertebrae. The continued use of the upper half of the body while the lower half is kept quiescent is the immediate cause of this rotation.

#4. Frequent curvatures are found resulting from displacements of an innominate bone. This means

- (a) the disintegration of the pelvis,
- (b) the localized weakness settles on one side of the pelvis, that is, on one of the innominate bones.

This is the curvature found chiefly in young girls at or after early puberty, especially where chlorosis and constitutional anemia are present, plus quality.

The innominates support the spine from the posterior spinous processes, the support of the spine really being placed midway between the two posterior superior spinous processes, in an erect spinal line running upward along the spine vertical with the coccyx. Any displacement of the two innominates, therefore, would tend to displace the support of the spine, and cause a curvature particularly in the dorso-lumbar region towards the side of the displacement. There are three times of this innominate lesion, from the side of causation. The innominate lesion may be

- (a) traumatic, or
- (b) organic, or
- (c) it may be associated with unilateral pelvic disturbances, that is, ovarian and fallopian tube field of circulation.

In either case one limb becomes shorter than the other and in this case walking continually displaces the spinal support, tending to weaken the muscles on the opposite side and to strengthen the muscles on the side affected. The result is partial innominate dislocation with a curvature lateral to the side of partial dislocation. In addition to this, walking, with the continued attempt to save the weaker side, results in the aggravation of the curvature by the weakening of the ligaments, that is, in the earlier curvature, the muscles are involved.

#5. Compensatory curvatures. Most of the compensatory spinal curvatures are found in pairs. The spine is so constructed that when a curvature takes place in one part of the spine the central gravity line of the body is altered in order to compensate for the change in the spine in relation to the central gravity line. Another curvature takes place in another part of the spine. In this case the curves are laterally in opposite directions. The cause here of the double curvature is the mechanics of the body in relation to the central gravity line. The two points of the central gravity line of the most impo rdance in upward erectness are the 4th dorsal in the upper half, and the 3rd lumbar in the lower half of the spine. Hence, all of these double compensatory curvatures gravitate around these two points.

In diagnosing these compensatory curvatures, it is of special importance to make a diagnosis as early as possible, particularly where the upper one-half of the spine is involved, that is, circle around the 4th dorsal. The reason for this is that the rotation of the vertebrae in the upper half of the spine is freer than in the lower half and consequently a rotatory or articulatory lesion is of more importance in the upper half than a lesion of malposition. In the lower half of the spine rotation is less free and, hence, in case of a lesion, malposition is at its maximum. For this reason the rotation lesion tends to develop more rapidly.

- (a) the first change is an articulation change in the upper half of the spine and the rotation change in the lower half of the spine. At first two vertebrae only are involved and then gradually the field widens;
- (b) the second change to be noted in the progressive development of the curvature is the enlargement and thickening of the muscles on one side of the spine;
- (c) the next change is the posterior movement of the ribs on the same side as the spinal muscle enlargement. This is the ligamentous reaction to the muscle condition of (b).

The cause of these conditions is the primary rotatory lesion. For this reason these three points are diagnostic of progressive curvatures or irregularities in the upper half of the spine. In the lower half of the spine these are either not present, or present in a less marked degree, because the lesion is more of the nature of malposition than of rotation, or articulation. Here rotation in correction is possible only in relation to the innomates, or the pelvis as a whole.

The diagnostic point in the lower half of the spine, therefore, is the position of one vertebra in relation to another, plus the degree of rotation of the articular process, together with the twisting of the ribs in the lower dorsal region, both at the angle and the head.

(d) Another important diagnostic point in the curvature of the lower half of the spine is the slanting of the line between the posterior superior spines of the ilia and, in some cases, the eversion of the one-half of the pelvis.

The curvature diagnosed at this stage either in the upper or lower half of the spine is simply one of muscle plus rotation in the upper half, and the muscle plus malposition in the lower half of the spine. In neither case is there a marked change in the ligaments or cartilages. Hence, the curvature is not in a state of fixation.

In the work of correction we must note these principles:

- (a) The first step, therefore, in the treatment of curvatures or irregularities, if found at this initial stage, is the correction of the muscular condition and the free articulation of the vertebrae involved and of the entire spine, with extension of the spine. In addition, in a curvature in the lower half of the spine, the free articulation of the pelvis on the spine at the 5th lumbar articulation with the sacrum.
- (b) The second stage in the treatment of such curvatures or irregularities is the correction of the lesion involving the relative position of the vertebrae on one another, or to one another.

Here the osteopathic principle is to apply manipulative force directly to the vertebra, using rotation plus a springing movement, or thrust, of the spine as the leverage to throw the vertebra back into its normal alignment. This method of treatment relaxes the ligamentous and cartilaginous articulations, stimulates elimination of accumulated venous blood and thus causes absorption of any accumulated material that has deposited around the vertebrae, or in connection with its foramina. When these things are accomplished the blood supply is freely established to and from the spine and the spinal muscles and this tends to re-establish vital relations between the different spinal structures;

- (c) Accessory treatment in the correction of these curvatures or irregularities may be given:

(A) In the form of voluntary active physiological exercise. The object here is to call into play the muscles all over the body centralized more particularly in the muscles of the back, the shoulders and the hips, in order to produce an equilibrium in the relative action of the muscles.

The patient should be dressed as free of clothing as possible, so as to leave the arms and limbs entirely free for movement. Among the active exercises the following may be specified:

- (1) place the patient in the normally erect posture and make the patient retain that position until he feels tired, noting the particular muscles that first give evidence of being tired. This locates the weakest muscle field in the body.
- (2) Make the patient exercise that particular portion of the body that shows weakness, the exercise to consist of movement of the arms, or limbs or a part of the trunk of the body in connection with the arms and limbs, each movement being followed by several deep breathing exercises, holding the breath and then free exhalation;
- (3) The free use of dumb bells of moderate weight, both sides of the body being exercised equally;

- (4) the patient lying on the back, or on the stomach, the exercising of the limbs and arms should take place, free movement of the extremities being given;
- (5) With the patient on the stomach, elevating the limbs on a chair, or against the wall as high as the patient can move them without inconvenience to the spine;
- (6) some form of suspension from the arms with the use of a bar or rings, or some other device, using the weight of the body as a leverage to spread the ribs.

All these exercises will help to increase the muscular tone and also the mobility of the tissues and to give free articulation and flexibility to the spine. These exercises should not be prescribed for the patient until after complete relaxation of the spinal muscles has been secured by passive treatment, and should be taken at least on every day when passive treatment is not given.

- (7) In special cases exercises should be given to build up the particular muscles that are involved. For example, a patient with a right lateral curvature in the upper half of the spine, should exercise chiefly with the arms, using the left arm more freely than the right arm. In left lateral curvature the reverse of this should be followed.
- (8) In curvatures of the mid-dorsal region the principal lesion is one of rotation. In case the rotation is to the left, active exercise should take place by bending the body toward the left as much as possible and exercising the right arm at the same time. This causes the rotation of the vertebrae towards the right and vice versa.
- (9) Following this a swaying movement of the upper half of the body forward and then backward will cause the muscles in the middle dorsal region to articulate in relation to the muscles both above and below.
- (10) In curvatures involving the lower dorsal region and the lumbar region, exercises of the lower limbs and the lower part of the trunk of the body should be followed on the same principle as in the case of the upper part of the body.

(B) Massage. For the relaxation of the muscles the free kneading and stretching of the muscles themselves, especially the groups of muscles along the back, should be given. In some cases where the muscles are rigid and tense a hacking movement should be given, also a stroking movement along with the hacking movement. The stroking in this case should be a rapid movement so as to produce rapid muscular contractions. The effects aimed at here are,

- (1) to increase the circulation, and thus
- (2) to increase the elimination of deposits and break down the increase of tissue. In addition, tone is given to the muscles and this tends to lessen the spinal column lesions. The ultimate aim is to strengthen the muscles so that they may act directly on the spinal column. In giving this treatment by massage

both sides should be treated in the same way so as to establish co-ordination among the different sets of muscles, and thus make them operate in co-ordination.

(C) The osteopathic method of correcting the curvature or irregularity brings into play the principle that vary in the different curvatures that are found. Each curvature is different from each other and therefore a distinct principle must be applied to each.

In the curvature of the upper and middle dorsal region where the chief lesion is that of rotation- place the patient on the table face downward and spring the spine:

- (1) by raising first then one shoulder and then the other shoulder and resisting this elevation by the pressure with the hand between the angles of the ribs and the spine on the opposite side;
- (2) a similar springing movement is given from the two sides of the pelvis, with similar resistance in the lumbar region of the spine;
- (3) flexion may be given to the spine, using the lower limb and the pelvis in combined fixation and rotation as means of producing flexion of the spine;
- (4) When the spine is held fixed, grasp the spinous processes with one hand on one side and the other hand on the other side of the vertebrae just below and above the curvature, while attempting to rotate in opposite directions;
- (5) following this, rotate the vertebrae in the curvature field by using the shoulder for leverage while applying the pressure, or a pushing movement on the spinous processes. If the curvature is aggravated and tense, apply extension to the head and shoulders, or ~~the neck~~ by both, when this treatment is given more
- (6) in cases of bulging ribs where the ribs bulge backward against the vertebrae, with the patient on the face, apply pressure from posterior to anterior on the bulging ribs at the same time lifting the shoulder on the same side; and in the case of the lower ribs lifting the pelvis;
- (7) When the curvature is in the lower dorsal region, the technique is similar to that in the middle dorsal, excepting that the pelvis, patient on back or face, is used as the point of leverage and the pull and push force required is greater; the shoulder may also be used for leverage;
- (8) in the 11th and 12th dorsal and lumbar regions give the corrective treatment with the spine at its maximum of flexion, either with the patient on the face or on the side, the abdomen and pelvis being supported by a pillow, or in some way. In this region the rotation of the vertebrae should be given as much as possible because normally rotation is at its minimum;



- (9) in the lumbar region there is great rigidity and probably no rotation. The best treatment in this case is an attempted articulation by elevating the limbs and pelvis together and attempting to move the individual lumbar vertebrae by a pulling and pushing movement on the spinous process. In cases of great rigidity in the lumbar region elevate one limb at a time and pull the lumbar vertebrae against the elevation from the opposite side, pulling the limb inward and outward at the same time.

Of special significance to us is an article by CORRIER in the Annals of Surgery January 1907. He has collected accounts of twenty cases of dislocated atlas, two of them his own cases. Traumatism, he says, applied to the top and front of the head is the common cause. There is no paralysis or anaesthesia. The neck is rigid, tender, stiff and the head is flexed and twisted to one side. In severe cases the head is bent towards one shoulder, with no head movement possible. In the simpler cases the head can be rotated more to the side to which it is bent. The side to which the chin is bent in the one on which the transverse process of the atlas is rotated back.

The points that bring out the diagnosis are (1) the position of the head; (2) the position and fixation of the transverse process of the atlas; (3) the displacement of the pharynx following the displacement of the transverse process of the atlas or the displacement of the axis.

He explains the possibility of the atlas dislocation by the fact that the atlas rests on two oppositely inclined planes of the axis. To permit of the free movement of the articulation the ligaments are loose, leaving the tension of the head and neck juncture and articulation dependent on the muscles. When the tonic muscle action is lost or lessened, the loose ligaments allow the head to rotate thirty degrees on either side of the median line.

In the treatment, he says, spontaneous reduction has taken place where the muscles are relaxed. This argues for treatment to relax the muscles. In other cases traction on the head accompanied by rotation will accomplish the reduction.

Here we have the recognition from the surgical standpoint of the osteopathic principle. The details are presented in full in the Annals of Surgery. If the view we have presented is correct, and it is in conformity with physics, physiology and chemistry, then the osteopathic principle represents a universal principle applicable in any field. The variable forms in which this principle appears in surgical cases, makes the principle one that can be applied in every variety of case. Consequently the osteopathic physician is armed with means to enable him to treat successfully any form of disease. His system, therefore, must be complete and independent.

### THE FIELD OF OSTEOPATHY.

To understand what Osteopathy is we must take a birds-eye view of its field. If Osteopathy is a science and art of treatment based upon definite knowledge, and the application of such systematized knowledge, to the treatment of disease, then the field of Osteopathy must take in that line of means made use of by human agency to support the life preserving forces in opposition to the life destroying forces at work in the human organism. The object of this means is to give relief from suffering, to increase resistance to the inroads made upon life by disease and to right conditions that are wrong, so as to make recovery possible.

According to this we recognize a field in which the living body possesses (a) the power of resistance, (b) the capacity of restoration and (c) the ability to recuperate, as native resources. Hence, the therapeutic field, which supply means the use of these resources, (a) the natural influences that operate in and through the organism in connection with its normal functionings; and (b) means used by human agency to establish normal structural and environmental relations, calling into play the protective qualities and the healing properties of a correctly adjusted and normally operating organism.

The living body is furnished by nature with (a) anatomical integrity, and (b) physiological completeness for the purpose of resisting disease. However perfect the native resources of prevention and healing may be, it is possible that structural derangements and physiological activities may be so altered that resistance may be lessened and recuperation hindered. This is what renders disease possible.

To preserve health, to prevent the operation of internal and external causes of disease and to recover from disease are functions of the vital organism. To the exercise of these functions certain conditions are attached. These conditions pertain to the structure and functionings of the organism. It is the duty of the physician to see that these conditions of the structure and function are normal in the organism; that each organ is capable of responding to the functional demand; that all the organs operate and cooperate within the limits of organic and organism capacity, and that the environment in which the organ<sup>sup</sup> lives and moves is conducive to health and not such as would retard or injure health.

The theory of Osteopathy, therefore, has to do with those conditions that are necessary to preserve health and to cure disease. The field that necessarily comes in for discussion, in order to have a proper understanding of this theory of Osteopathy, may be summarized:

(1) It is the field of those causes that modify or interfere with the essential conditions of health. This field of causation may be

(a) internal to the organism, including structural defects, modified physiological relations, or correlations, altered physical relations of the molecules to one another or to the molecular forces of nature, and hereditary predispositions;

(b) external to the organism, deficiencies in the proximate principles of food and water and oxygen, abnormal toxic substances, traumatism, variation in the physical forces, such as heat, electricity, atmosphere, environment, etc.

(2) It is the field of native resource within the organism in virtue of which the organism possesses a certain immunity to disease and definite protection for the causes of disease. This gives to the organism the power to resist both diseases and their causes. Among these native resources must be classified, (a) natural aptitudes that favor health, including the instincts of self preservation and the natural desires and ambitions; (b) protective mechanisms within the organism, such as the reflexes of coughing, vomiting, pain, etc; (c) the processes of elimination for the throwing out of wastes; (d) the powers of reconstruction and even the creation of materials that are necessary for the organic existence; (e) the capacity of education developed through the nervous system, involving the power of adaptation to conditions, adjustment to surroundings and the power of reaction to and from stimuli; (f) the power of co-operation in connection with the different functions of native resistance. Here the body, if structural integrity and physiological activity are preserved, has the power of maintaining its normal place in the field of nature, accomodating itself to the enviroing conditions, and even using these as means of promoting health and happiness. If the organism cannot preserve its normal balance in the environment, the environment may be changed. Here the lesion is one of surroundings; (g) the power of substitution. This is illustrated within the organism, in the cells and in the organs and especially in the nervous system.

(3) It is the field of those changes that take place in disease. These changes include

- (a) the changes in structure appearing as effects or results, such as the formation of new tissue, either as a reparative process or as an attempted elimination process in connection with neoplasms; or the disintegration, degeneration and destruction of tissue, found in the typical morbid anatomy field;
- (b) functional changes reactive to or expressive of the etiology.

Here we have the symptomatology of pain, tenderness, exaggerated or diminished functioning, suppression of functioning, etc. These are physiological expressions of the disturbed condition that are involved in diseases.

(4) It is the field of treatment from the standpoint of relief, recuperation and immunity or protection, including

- (a) the use of the protective capacity in connection with the anatomical integrity and physiological correlation, in connection with which accomodation, secondary adjustment and compensation are possible as means of preserving life and maintaining functional equilibrium;
- (b) the use of palliative means to give relief from suffering by means of rest, the anaesthetic effect

to relieve pain, properly graduated exercises, diet, baths, etc;

(c) the use of remedial measures based on a knowledge of perverted physiology or the morbid anatomy found in diseases. Here the measures include environmental and bodily conditions designed to restore the normal condition of a part, or parts, affected in disease. In this case the symptoms are used as a means of interpreting functional changes, and the morbid anatomy, chemical and microscopical analyses and examinations, as means of interpreting structural histological changes. Whether, and to what extent, such conditions can be altered represents the dearest problem of therapeutics.

Here we have classified briefly the field of Osteopathy.

In this field the main factor is that of altered adjustment, because normal health implies normal adjustment; unhealth presupposes maladjustment; and disease represents certain effects or results that flow from and succeed previously existing conditions of unhealth. Thus the field is covered by the term lesion. In this case we use the word lesion as the most expressive term that can be found.

A lesion represents any variation from the normal in the adjustment of the structural parts of the body, or the correlation of the functional activities of the organism. Here the body refers to structures. A LESION may represent two things:

(1) A change in the structural adjustment of one part to another. A structural change refers to the morbid anatomy in the field of pathology.

(2) Alteration in or modification of activity. This implies, or refers to, (a) the vitality, centralized in the cerebrum, (b) the vital processes, centralized in the medulla, (c) the activities of the body as a whole. These are commonly called phenomena and are centralized in the cerebellum and basal ganglia and, subordinatedly, in the spinal cord. The brain also has activity and phenomena. Here the cerebellum and basal ganglia and spinal cord represent co-ordination.

The motor and sensory areas are in the cerebral cortex; these represent the voluntary or conscious side; the cerebellum and basal ganglia represent subconscious or involuntary. The activities are rhythm and peristalsis. Life in all tissues is characterized by mobility. The cerebrum represents the vital force; the medulla the vital processes; the cerebellum the phenomena resulting from the vital activity. There are eight classifications of lesions to be noted:

(1) The osseo-ligamentous lesion. This is a lesion involving both the ligament and the bone. This explains how we have a displacement. Any displacement, therefore, involves the cartilage, ligaments and bones. Because of the involvement of all these in a lesion there is tension, and modified tension produces displacement. Modified tension is the basis of this type of lesion.

(2) The muscular lesion. Here we have some change in the muscle, for example, a tight muscle, or one overcontracted; here is exaggeration of the contraction phase of the muscle cycle; a loose or flabby muscle, one in which relaxation or rest is exaggerated in the

cycle of muscle activity. In this type of lesion the important factor is modification of the muscle cycle.

(3) The Osseous Lesion. This is very rare because you cannot move bones out of place without involving the ligaments or cartilages and muscles. Osseous lesions may occur in the small bones of the hand or foot, for example, Morton's Toe; but even here there is a cartilage involvement. The surgical osseous lesion is spoken of as the solution of continuity.

(4) The Organ Lesion. The displacement of an organ, for example, the dislocation of the heart, especially in children; the displacement of the lung, especially in cases of tuberculosis or consumption. Each organ in the body articulates in its own field and this articulation equals relation of organ to organ. The only way to restore an organ to normal position is to restore what keeps it in place.

(5) Lesions in the proximate principles of the body. A proximate principle is the simplest combination of chemical elements as we find them in the complex composition of the body. There are six proximate principles, three classified as greater and three as lesser:

|                                    |   |   |   |                |
|------------------------------------|---|---|---|----------------|
|                                    |   |   |   | (Fats          |
|                                    |   |   |   | (Carbohydrates |
|                                    |   |   |   | (Proteids      |
| The great Proximate Principles are |   |   |   |                |
|                                    |   |   |   | (Gases         |
| The lesser                         | " | " | " | (Water         |
|                                    |   |   |   | (Salts         |

Death may result from a lack of any one or more of these proximate principles, for example, diabetes, representing in the bioplasm the lack of the carbohydrate principle, the sugar being present in the urine. Bright's Disease—there is a lack of proteid in the bioplasmic field, albumen being present in the urine. Toxic substances foreign to these proximate principles are classified here.

(6) The Tissue Lesion, especially the blood as a tissue. A tissue includes Cells and Intercellular substance, in the histological sense. In the blood we have, Cells, the white corpuscles and intercellular substance— the red corpuscles and the other constituents of the blood.

All blood diseases come under this head. The true cause of anemia is the inability of the blood, as a tissue, to assimilate iron, or the other substances necessary for the reconstruction and reintegration of the blood.

(7) The Mental Lesion, or The Psychic Lesion. Medicine, in the drug sense, only applies to the physical side of man. We take note of the mental side because a purely mechanical lesion, like a purely machine man, is an impossibility. The vital represents the psychic or the mental and for that reason the term organism should be applied to the body instead of mechanism. In the human organism we have both mind and body, and osteopathically we have to take account of both.

(8) The Environmental Lesion. Here we have the lesion found in the hygienic, dietetic, climatic and social side of the patient, that result being modified stimuli that react from the

health, functioning and even the structural adjustment of the patient .

Mind is the dominating part of the organism, hence we have consciousness that applies to the higher mental life. The mental lesion is present where physiological activities have been put in the field of consciousness. All of the vital processes and activities lie in the subconscious field. In this subconscious field we have the activities and processes that take place in the body in connection with disease. The field of the mental lesion then is two-fold:

- (a) There or when the conscious mind drops down into the field of the subconscious, the mind in this case being degraded to the material plane;
- (b) There the subconscious field is elevated into the conscious field. Here we want the idealist.

This raises the question of the Relation of Mind to Body. The organism is a unity but this unit organism consists of three parts, all of which are essential to the organism. According to the old Platonic idea the three are:

(Body  
Plato.....(Mind  
(Spirit

According to the Christian idea represented by Paul, we have:

(Body  
Paul.....(Soul  
(Spirit

Plato and Paul both believed in the immortality of the spirit. Soul is that part of man's vitality which represents the animating principle of the body; Spirit is the immortal part of man.

According to Theology Body, Spirit and Soul represent three parts of the human organism.

According to Modern Psychology Body, Subjective Mind and Objective Mind represent the three parts of the human organism.

The body is what we deal with in biology, anatomy and physiology. The Subjective Mind is the mind that we have without any limitations, so memory and reason are perfect. All knowledge in this field is intuitive.

(See "Divine Pedigree of Man"- Hudson.)

The Objective Mind is the imperfect mind, with imperfect functions. All knowledge in this field is derived from experience, so that the objective method is the only one that can be used.

The Subjective Mind can be reached in the body only through the standpoint of the objective mind. The principle by which we reach this subjective mind is suggestion.

(Mental  
There are three forms of Suggestion (Verbal  
(Manual

(1) In the subjective mind there is no limitation of time or place. The mind can meet on the mental plane with another mind. The objective mind is the mind that develops in the body as a result of the union of the body with the subjective mind. The subject mind is immanent in the body, i. e., resides in the body without being necessarily and essentially a part of the body.

(2) The objective mind is a part of the body, or rather is the sum of qualities developed in the body from the vital side. The subjective mind is not a part of the body but an integral part of the organism personality. This means that when the body ceases to exist the objective mind also ceases to exist.

(3) The vital force represents the animating principle of the body, i. e. one of the qualities of the objective mind. This vital force manifests itself in the vital activities of the body.

(4) This vital force is specialized in particular tissues and organs of the body, which are called the organs of vitality, (organ literally meaning an instrument.)

(5) In each cell of the body there is a cell life, which is peculiar to the individual cell. This makes the cell the unit of life.

These are the five characteristic points associated with the objective mind, or the mind of the body.

The subjective mind is the immaterial as it comes to manifestation within the human body. The old philosophers taught that the immaterial manifested itself in all material things, i.e. the conscious shows itself in the subconscious or the non-conscious.

The immaterial expresses itself in all material things via, or through the medium of some force. There are seven great forces that represent the expression of the immaterial in and through the material.

(1) Inertia. This is the latent force of motion or capacity for motion in all material substances.

(2) Coardination. This is the physical force which keeps all physical bodies together by some principle of attraction.

(3) Affinity. This is the force that lies at the foundation of chemistry, in the attraction of the fundamental elements to one another chemically.

(4) Heat- represents, as physics say, a mode of motion that generates the energy of destruction.

(5) Light and Sound. These are modes of motion on a higher plane than heat, namely, on the constructive plane as compared with heat.

(6) Electricity. or Electric Force, or Magneto-Electric Force. This is also a mode of motion on a higher plane than light in the supra constructive field.

(7) Vital Force, representing the force of motion or mobility as it belongs to all animate bodies.

The objective mind follows the inductive method and learns by experience.

The subjective mind follows the inductive method, and reasons a priori about the contents of experience.

To the Osteopath, however, there can be no greater subject than physiology, because applied physiology is the *materia medica* and therapeutics of osteopathic medicine. The editor of the *Medical Brief* makes the statement "no physician can be a good diagnostician or therapist who is not thoroughly familiar with physiology." The earliest stage of any disease marks always a slight deviation from normal function. This may become exaggerated and then we have a pronounced abnormal and pathological condition. If any professional man should be an independent thinker the physician ought to be. No man can call knowledge his own until it becomes a part of his nature and he only has real scientific knowledge who has attained that knowledge by personal experience. It doesn't matter how eminent the authority one may quote if added to the authority there is not the subjective experience of the person quoting the authority, he becomes simply a machine. Automatism in the field of osteopathy is even more hazardous than in the old medical field. It goes without saying that if the system including body and mind is perfect structurally and functionally, without derangement, there is a healthful condition. If, however, there is deviation along any of these lines, that deviation must be detected by the osteopath in order to treat successfully. An imperfect diagnosis implies that treatment becomes experiment.

The science of medicine is not limited to the prescription and knowledge of drugs. This is the degenerated idea of medicine. The science of medicine deals with the preservation and prolongation of human life and with the curing of those abnormal conditions or diseases which tend to weaken or destroy. Medicine in its history has followed several curative principles. Primarily associated with priestcraft it consisted of certain ceremonial observances. Later it consisted of certain charms which the superstitious character of the people encouraged. To this day certain forms and incantations are believed to possess medicinal virtue.

In the definition of the science of medicine, I think it is wide enough to cover osteopathy, because I believe osteopathy is a part of the science of medicine and osteopathy should claim the word medicine in its original sense, namely, that of healing. There are three great fields of knowledge in the science of medicine, anatomy physiology and pathology. Anatomy is the science of organization or of the structure of the human system. Physiology is the science of organized life in connection with its various functions. Pathology is the science that deals with the abnormal conditions of human life, either structural or functional. Physiology thus forms the middle science in this trinity of sciences.

But, physiology figures in a wider field than was at one time supposed to belong to it. Physiology has not only a bearing upon the field of medicine but also upon psychology and through psychology upon the whole field of education, culture, intelligence and sanity. Physiology explains and largely accounts for psychological conditions, for true psychology is founded upon physiology; the mental states and activities are not of value only as they are illustrations and manifestations of physiological relations and conditions. The psychic conditions of life are brought out not only in the field



of education, in adaptations to study, but also in the study and diagnosis of mental diseases, and in many of the nervous diseases.

The physiology of the brain, the spinal cord and the entire nervous system is at the foundation of every true theory of life, whether we take it as physical life, in its preservation, prolongation and its treatment under diseased conditions; or in regard to mental life and even the higher moral and spiritual life. A correct knowledge of physiology applied in the field of psychology has rendered obsolete the older ideas and plans of education and given rise to the modern natural school of education that has done so much to evolve true plans for education and true methods of study. May we not look for the same reform in the field of medicine when physiology is taught in all its bearings as it teaches us the true functions of a differentiated human life consisting of a number of organs all of which are independent and yet are united to form a single life.

When we step into the higher field of psycho-physiology we realize the fact that mind is the ascendant power and that in a healthy physiological life nothing less than a healthy mind can secure that vigorous condition of body which is so much desired by all, health and happiness. We must realize that, while we treat what seems to be purely body diseases, we must not overlook the fact that psychopathy opens up the field of mental disease and reveals certain mind conditions without the removal of which it is impossible to cure bodily diseases. This wide field we believe is opened up before osteopathy and we think we do not claim too much when we say that this field can only be entered through the gateway of osteopathic physiology and psychology. With this conviction we present a brief summary of the psychological side of human life, leaving for future consideration the psychopathic side.

The physiologists have largely limited their investigations to the separate parts of the central nervous system without attempting to formulate any plans of systematic action on the part of the system as a whole. This has produced in physiology a tendency to over-estimate the importance of specialization of function, over-looking the fact that there is a solidarity and unity of action on the part of the entire system. It is probable that every active operation of the nervous system affects the whole human system; in this way there must be constant activity on the part of the nerve cells accompanied by continual impulses entering and leaving the cells. This forms the basis of "the continuity of conscious experience." Behind consciousness, at least, from a morphological standpoint there lies the anatomical structure of the nervous system; but as yet no one has been able to solve the problem of their relations. The region of consciousness has been gradually moving upwards with the development of physiological theories until, as one physiologist has said, it has had to take refuge in the only remaining region after the sensory and motor areas have been localized, namely, in the anterior portion of the gray matter of the cortex.

Ancient philosophers did not limit the mind to the brain. With the dawn of the modern psychology the center of conscious mental, emotional and volitional phenomena was associated with the medulla,

in more recent times to be localized in the frontal area of the cortex, largely because this is the only portion of the brain left for its localization. Even if we could understand all the changes taking place in this region we should be unable to bridge the chasm between the purely subjective and the objective; much less would we be able to resolve mental phenomena into their proceeding causes.

Physiology has divided mainly into two schools, the one materializing the mental phenomena by ascribing them solely to physiological and physical causes and the other idealizing them by calling them figurative names which in reality give no explanation of the phenomena themselves. By the combination of both of these ideas we have a fundamental, physical and physiological basis for the ideal interpretation of these phenomena. If we enter into the realm of the transcendental and premise the existence behind all these phenomena, whether physical or mental, of metaphysical essence, then an explanation becomes more clear, because these phenomena of mind and body become simply manifestations of this inner, deeper and truer existence. The difficulty in this case is that such an essence which metaphysics would identify with soul cannot be proven in any possible way by science. At best it is simply a metaphysical conception.

Without attempting to solve this question there is an important physiological question, whether physiology has any ground for localizing consciousness and the entire psychic phenomena in the frontal area of the brain? If we can interpret aright the facts of comparative physiology then this theory is not founded upon fact. Physiologists localize in the brain sensation, that is, here terminate all those impulses which result in consciousness. Yet the other portions of the nervous system which convey the impulses to this sensorium may have as much to do with consciousness as does the sensorium itself. In the lower animals whose brain development is very simple, possessing none of the characteristic cortical convolutions associated with mental phenomena in man, we find consciousness. This view is based upon the perfect unity of the body and especially of the nervous system. It gets over the difficulty which modern physiology emphasizes of perfect localization of the different functions.

In the earliest conditions associated with cell development we find the single cell subject to stimulation, undergoing certain molecular changes, these changes sending out impulses to other cells and also along nerve paths to the surface of the body. If the first cell which is more or less differentiated in function by reason of the capacity of receiving and transmitting impulses becomes more fully specialized by continued stimulation so that its changes are accommodated to this special kind of stimulation and respond to such external stimuli as it has become accustomed to have, we have the first beginnings of consciousness and also of memory. Consciousness even here is not the product of the changes that take place in the cells, because even a knowledge of all the internal changes would not involve consciousness, as the consciousness would only arise in connection with some external manifestations.

Some have explained this by presuming that there is associated with matter a consciousness; but this cannot be, because we find no connecting link between physical matter and psychic consciousness. Therefore, we find two seeming opposites neither of which is the cause of or is caused by the other. This connection has been completed by some who have identified energy of some kind with the causation of consciousness. Energy, however, is a physical attribute in virtue of which certain matter or matters possess the power of acting, this action depending upon the active changes taking place in the constituent elements. If these changes which we suppose to take place in the cells upon the basis of molecular activity form the basis of consciousness, then consciousness must be a material and not a psychic quality, because the result cannot contain more than is found in the cause. The simple substance changes or matter movements cannot therefore explain consciousness.

Consciousness is therefore inexplicable unless we hypothesize the psychic as we do the physiological, each one in its own sphere forming the basis of its own characteristic activity. If we consider the nervous system as consisting of a complexity of nervous mechanisms, each mechanism in its simple form constituting an activity in which there is consciousness, then the entire nervous system would represent a complex series of conscious states from the psychic standpoint. Consciousness must exist then not only in the case of the entire brain but in all the cells that constitute the complex brain. If stimulation is applied to a sensory part of the body an impression is carried into the central nervous system, a reflex movement of some kind resulting. There is here a reflex action which has no volition, at least from the brain center and yet there is a consciousness of the changes taking place in connection with the reception and distribution of the impulses. The center of reflex action outside of the brain has a close connection with the cells in the gray matter of the brain so that every sensory area of the body has a connection with some portion of the brain. Impressions may pass outward reflexly from these cerebral centers to other centers resulting in involuntary movements, but impulses may also pass from these sensory centers in the cortex to the centers of volitional impulses resulting in voluntary movements. Every voluntary action is however essentially a reflex action depending upon afferent stimulation either at the time when the action is called forth or at some prior period.

The impressions made upon the cells or combinations of cells are retained, thus constituting memory so that, when the impulses are aroused, volition has a basis upon which to act. If we add to this the fact that by means of vision when an image is formed upon the retina the optic nerve transmits it to the corpora quadrigemina where co-ordination takes place from whence it is carried to the optic region in the cortex. This image when impressed upon the cell constitutes a memory picture, which under the influence of impulses, may be awakened in consciousness so as to call forth activity. These sensory impressions may, however, not only be aroused to consciousness in the cerebrum, but also in the cerebellum, where co-ordination takes place. It is probable that sensory regions are found both in the cerebrum and cerebellum. If this is so then the convolu-

tions of the cerebrum and the cerebellum represent, the latter the seat of regular rhythmic movements that are not dependent upon volition, whereas the former represents the voluntary element in all movements. When different sensations are produced by the action of an object or objects as stimuli upon different parts of the sensory surface, molecular changes set up in different cortical regions, these regions being connected together by the fibers of association so that when consciousness receives these different impressions they are combined to form a single idea. Instead of being combined, however, in the mental picture; these combined impulses may give rise to muscle movements, the movements depending largely upon the stimulating causes. When the stimuli are strong the impulses pass to the nerve cells in the brain where, on account of their strength, they make a vivid impression upon the cells so that after the stimulation has passed away the impression continues, being subject to recall upon a slight stimulation, either external or internal.

Here we have the physiological basis of the association of ideas which occupies such a prominent place in Psychology and also the basis of memory and recollection. By the constant repetition of these processes the impressions become so closely associated with the cell body that they form an inherent part of the cell life so that by heredity these are transmitted from generation to generation forming the physiological basis of mental intuitions. These intuitions represent modifications of the brain under the influence of mental development, each brain representing its own stage of progress in evolution. Where we have a great number and variety of impressions we find great variation in the cell changes and a corresponding variety in the mental phenomena. When these impressions are so fixed in the brain that stimulus from another part of the brain can call forth a response, we have a fully developed mental condition. In this way the pictures of scenes seen by the sense of vision or objects brought into contact with the sense of touch may be stored up within the brain cells to be awakened at the call of some mental stimulus.

Some physiologists say that they may be aroused spontaneously. This, however, is probably incorrect as what seems to be spontaneous awakenings are dependent upon weak stimulation, often mixed indirect. The sight of an object may arouse impressions formerly associated with such an object or with one analogous to it, the simple call being sufficient to arouse a dormant impression. In this way we find that phenomena which at first seem purely voluntary and arbitrary become purely reflex, or at least cease to be associated with conscious volition. In the case of the child persistency of effort enables it voluntarily to walk. After childhood these movements may be quite unconsciously performed. In the same way mental phenomena may become purely unconscious, so much so that certain actions are often spoken of as being done instinctively.

It is generally conceded that there may be unconscious mental activity, the result of this mental action later becoming conscious. Mental development implies the receptive condition of the nerve cells and also the active operation of these cells in the changes involved in molecular development. These are regulated somewhat by the capacity of selection in the case of different impressions, by

the concentration upon particular impressions to the exclusion of others, by the activity of the cells in connection with the particular impressions and the power of associating these impressions. Each of these elements has a physiological basis in the central nervous system, and they may become more stable by discipline, the brain development depending largely upon proper exercise of it. This implies that individuals differ from each other in the original constitution of their nervous system, this forming the basis of different degrees of intelligence and psychic initiatives, as we find these among different individuals. These, however, are based primarily upon hereditary acquisition handed down along with the system itself from ancestors.

Thus, to each one is given by birth not only a body but also a mind, the basis of mental character and development. When man starts out from this initial point in his mental history his development is determined largely

- (a) by environing conditions and educative processes;
- (b) the power of volition may also be increased by exercise so that the inhibitory control depends largely upon the same educative influences.

Both of these are exerted through the medium of the body.

The body consists of masses of cells bound together by means of the vitality. Therefore, there are two types of life—individual cell life and organic life—vital force. The substance of the cell is protoplasm. When this substance is completely vitalized it becomes bioplasm. This bioplasm of the cell represents living matter in its simplest form.

Protoplasm is non-living in itself. The protoplasm itself as the primary substance is an emulsion in which the solid elements are suspended in a fluid medium. When a solid is suspended in the fluid we get the first substance, protoplasm. This protoplasm as substance is at first without form, that is, it is structureless. Bioplasm represents structural substance. When it is bound together by a cell wall and in the center of a mass is implanted the nucleus we have the original cell of bioplasm. Illustration in the body here may be given, namely, the blood: the white cells represent the bioplasm and the red corpuscles represent the protoplasm. This explains a point, namely, body life and spirit—the body life is inseparable from the matter, the spirit is separable from the matter.

The body organism represents a mass of these bioplasmic and protoplasmic elements. An organism consists of:

- (1) A number of parts, each part separate and having its own function.
- (2) These separate parts are united together by means of the common bond of vitality, namely, the organic life.
- (3) Each part in this unity is both a cause and an effect, that is, each part is both related and correlated to every other part, for example, the blood being the circulating fluid medium for the body as a whole, and yet the blood is made for each part of the body.

This bioplasmic and protoplasmic living substance united to form an organism has three sides from which we may consider it:

In the body we find three fundamental elements representing three sides of the organic life, namely:

- (1) The chemical
- (2) The Histological and
- (3) the Physiological.

(1) THE CHEMICAL SIDE OF SUBSTANCE OF THE BODY.

In the chemistry of the body (physiological chemistry) there are two great sets of constituent elements- the proteids and the non-proteids. The simple elements from which the body is formed, chemically, are Oxygen, hydrogen, nitrogen, carbon and also, subordinately, phosphorus and sulphur. The last two are sometimes called the blending elements in the chemical field. In this light phosphorus represents the blending element of all nerve tissue; also sulphur represents the blending element of muscle tissues and other tissues. Non-proteid elements represent energy and heat in relation to the body and the work of the body. The proper balance of these two types- proteid and non-proteid- represent the chemical integrity of the body.

The Proximate Principles of the Body are:

- (1) Proteid representing the nitrogen element.
- (2) Carbohydrate, representing simple compounds of carbon.
- (3) Hydrocarbons, or fats, representing carbon on  $H_2O$  basis.
- (4) Gases. The two most important gases in the body are  $CO_2$  and  $O$ . Both of these gases are necessary, the proper relation of the two gases being fundamental to respiration, digestion and excretion.
- (5) Water. Here we have from 65 to 88 per cent of body composition, namely, the original fluid in which the solid substance of the body is suspended.
- (6) Salts. The principal salts are sodium, e. g. sodium chloride; carbonates, calcium or lime salts; iron salts, etc. for the construction and reconstruction of the soft tissues. Sodium salts maintain the isotonicity of the blood, and the other solid tissues. . . . .  
 . . . . . for construction and reconstruction of hard tissues;
- (7) The necessaries include the stimulants. The chief stimulant in the body proximate principles is alcohol the body preparing its own alcohol. Dietetics classifies here artificial stimulants found in foods, such as spices, pepper, allspice, tea, coffee, alcohol and medicinal drugs.

Among these proximate principles  $H_2O$  should be placed first, because it represents the largest proportion of the body substance and the fundamental in which the solids of the body are suspended. Only one-sixth of the body represents solid elements. This explains why hydration and dehydration processes are the basis for all excretion, e. g., urea, uric acid, etc. This point is emphasized by the fact that construction and reconstruction in the body is always based primarily on water. This is also emphasized by

the fact that the absolute ? of the watery secretions of the body takes place from the cerebro-spinal side.

The proximate principle, therefore, is the unit of the chemical life of the body. The body requires nothing that is not included in these proximate principles of the body organism. In fact the body cannot use anything that is not a proximate principle. Anything that comes under the head of proximate principles and can be used by or in the body is food.

In the supply of these proximate principles in food form an estimate has been made per diem of the necessary supplies, namely,

|                  |                                   |
|------------------|-----------------------------------|
| Nitrogenous..... | 100 gr.                           |
| Non-nitrogenous  | (Carbohydrates.....250 to 350 gr. |
|                  | (Fats..... 90 to 100 gr.)         |

(2) THE HISTOLOGICAL SIDE OF SUBSTANCE OF THE BODY.

The unit of the histological side is the cell. The unity in connection with the different tissues and the body is the vitality of the cell, hence there are three things that we must remember in histology, at least, as bearing upon the principles of Osteopathy:

- (a) The body is made up of a mass of cells.
- (b) These cell masses are developed and differentiate in different ways to form tissues and organs. Therefore in this mass of cells (1) each cell has its own substance and vitality, (2) all the cells are bound together by a certain vital affinity and form the body, a community of cells, (3) The vital force of the body unites all the tissues and organs so as to constitute the body into an organism. Tissue then means a definite combination of unit cells, the cells being bound together by vital affinity.

The cell has its origin in the original mother cell and this mother cell is primarily fluid. This is the reason why all the life elements in the nutritive field are found in the fluid medium, the fluid carrying the nutritive substances from cell to cell. In this sense the blood, as a fluid, is the life:

- (1) Because it is the basic tissue;
- (2) Because it replenishes the life of the other tissues.

The Histological Basis, then, may be summarized:

- |            |  |
|------------|--|
| (1) Cell.  | 1. Cells   |
| (2) Tissue | 2. Tissues (including organs)  |
| (3) Blood  | 3. Organism, combination of tissues and organs by a common vitality. |

(3) THE PHYSIOLOGICAL SIDE OF SUBSTANCE OF THE BODY.

Here we must take account of two things:

- (a) that the body represents an organism in which the life is organized and centralized. This applies only to the human body in the highest sense;

- (b) The expression of this form of life takes place through functional processes and activities.
- (c) These manifestations of life take place in the physical life by means of: (a) tissues, (b) organs, and (c) the body as a whole, constituting the vital mechanism.

The fundamental unit in the physiological life is the combination of cells found (a) in the tissues and (b) in the organs. Hence the chief fact in the physiology of the body is the fact that each cell is related to every other cell in the organic unity of the body. The union takes place by means of the vital force, or the vitality. This union of cell with cell is established in different ways:

- (a) Physically, each cell in its original having amoeboid characteristics and physical properties;
- (b) Cell communicates with cell by reflexes, that is, communication takes place by actual contact. In this second type the reflexes (reflex communications) take place through a medium and this medium and this medium always implies a nerve cell.
- (c) Cell is related to cell anatomically. The anatomical relation is established by means of the soft tissues, e. g., the entire bony framework of the body is bound together and moved by means of soft tissues, such as cartilage, fascia and muscles.
- (d) Cell communicates with cell physiologically. This communication takes place in one of two ways: (1) either by the BLOOD, including the other fluids of the body, or, (2) through the nervous system. The blood here as a fluid includes five different forms of fluid:

- (1) Blood proper
- (2) Lymph proper
- (3) Cerebro-spinal fluid
- (4) Insole fluid
- (5) Secretory fluids.

In the mature developed body all of these fluids are intimately associated with the blood. Therefore, the blood is the foundation fluid. In the process of development the lymph is the primary fluid. The muscle fluid and the secretions are derived from lymph by processes of absorption and secretion. The cerebro-spinal fluid is an original fluid like the lymph, existing before the blood, e. g. in embryonic life we have it in the early part of the body development, about the fourth or fifth week.

The Nervous System as a means of cell communication. This system consists of nerve cells and fibers belonging in adult life to two distinct systems:

- (a) the cerebro-spinal, found in the brain, spinal cord and peripheral nerves from the brain and spinal cord.
- (b) The sympathetic system, including all the rest of the nervous system, which is subordinate to the sympathetic ganglia and plexuses and their axones.

From the physiological side the principal point here emphasized is the relation of the structure to the structure on the one hand and the function or activity of the structure on the other hand.



Physiology lays down a number of laws to be noted here:

(a) The function is determined by the form, that is, structure. This takes place in the field of development, either natural or artificial, e. g., change of form may cause change of function.

(b) The form is determined by the function. This is true in the field of use or adaptation, e. g. in some cases where there is defective brain development we can cure imbecility by altering the form of the brain or cranium and changing the functional activity of the brain through the form.

(c) The functional activity makes or unmakes the organs of the body. One organ differs from another because of its special function. Some organs cease to exist from non-use, for example, the thymus gland, in the normal development of the child.

(d) Each organ has its own type of cells, hence we have as many kinds of cells as there are organs. This is histological physiology. The development of these organs and their cells is guided by the nervous system. In development as well as in function the nervous system represents the sum and the substance of all the tissues of the body; hence all diseases are practically nervous diseases, because the nervous system is the foundation for all development in the body, and modified or altered development has as its basic characteristic nervous system modification, functional or structural. This explains why the ultimate field in all therapeutics must be the nervous system; if the nervous system guides all cell development, cell degeneration must be traced back to nervous system degeneration and neuroses.

#### THE NERVOUS SYSTEM:

(1) The Sympathetic System, the function of which is to guide and control the viscera both in their development and in their activities.

(2) The General Nervous System, which has as its main function the control of the voluntary movements of the body, of the tissues and organs; and secondarily the control of the involuntary movements in connection with those fibers which pass through the sympathetic system.

The organs and tissues of the body representing the apparatus of activities may be:

(1) Normal. In this case we have the structure and the function normal.

(2) Abnormal. (a) Hypertrophied or enlarged, from some structural or functional cause, e. g., hypertrophy of the heart, or of the liver, caused by too great activity of the organ or too slow circulation of the blood, or the development of foreign substances in the organ. (b) Atrophied, that is, diminished in size from insufficient, improper or non-use; e. g., the lack of fats in proper form in the nutrition causes the hypertrophy of the liver and the atrophy of the spleen. Malaria acts similarly in relation to the spleen and liver; hence malaria is difficult to cure in the field where fat is deficient in the nutrition.

In the case of normal organs the organ should be both tonic and trophic. This applied also to the tissues of the body.

(1) All tissues and organs of the body if normal must be in a trophic state. The trophic condition indicates three things:

(a) Perfect nutrition. This refers to the supply of the nutritive materials that takes place through the medium of the blood, and secondarily, through the lymph. This field includes water, food and oxygen.

(b) Perfect trophicity, on the plane of metabolism, or assimilation. This refers to the supply of certain materials through the medium of the nervous system. The fluid in this case is the cerebro-spinal fluid. The materials are those supplied to the cerebro-spinal fluid by the nerve cells, particularly those of the brain. The principal substance supplied is the nucleo-proteid.

(c) Perfect nerve force, or nervicity. This means that the nerve force communicated by the nerve fibers to the tissues and organs produces an assimilation, (1) of food materials furnished by the blood, (2) of nucleo-proteid, furnished by the nerve fluid, and (3) force furnished from the nerve cells to the nerve fiber. This double assimilation results in the perfect trophic condition of the tissues.

(2) All tissues and organs of the body are tonic. This represents the tone of the tissues distinguished from trophicity. Tissue tone implies two things: (a) partial contraction, (b) partial relaxation, (c) these occurring simultaneously, the contraction, however, predominating. Here we have cycle. The tone of the tissues constitutes, or is measured by a cycle. The three factors in the cycle have a rhythmic relation to one another. The three factors of the cycle are as

- (a) Contraction,
- (b) Relaxation,
- (c) Rest.

The relation of these three to one another is based on and kept up by nutrition. The regulation of the cycle and the control for each of its parts takes place through the nervous system. Nutrition implies the three points already referred to under the trophic state. Regulation implies the nerve force. Nutrition holds the balance in the cycle of tissue and organ activity.

#### The Body as a whole:

(1) The body organism represents a mechanism consisting of several parts, bound together and correlated in and to the organic life. In this mechanism the separate parts represent mechanical apparati. These apparati are so arranged and combined together that we find:

- (a) The entire mechanism is built and bound together on a definite plan of architecture.
- (b) These apparati have a working arrangement among themselves, constituting a sort of division of labor.
- (c) The development of the different apparati takes place in the harmony of the general purpose of the organism; hence the body has its framework, consisting of the harder tissues, such as bone, cartilage, etc. It also has its attachments or appendages, such as the soft tissues, connective tissue.

In the development of the body the starting point is the cell. In the building up of the body the general basic principle is the anatomical structure, or the framework of the body. When the body

is made we deal with it in its completed form, not from the anatomical but from the mechanical standpoint.

(2) The body organism represents a vital mechanism. This means that we are dealing with a body which is living; hence all lesions involving the structure of the body are not only mechanical, but vital lesions. Every disturbance in the organism that we call a lesion represents three things, therefore: (1) an anatomical condition or conditions; (2) a mechanical condition or conditions, and (3) a vital disturbance, or disturbances, because the change in the anatomy and mechanics alters, or modifies, the vitality. The disturbance in vitality represents the essential part of the lesion; therefore ~~fix~~ we are dealing not with a mechanical body which would be a dead body, or a dead machine, but with a living. This disturbance represents:

- (1) An alteration in the adjustment of one structure to another. The first thing to do, therefore, in overcoming a lesion is to remove the lack of adjustment, in two senses: ~~fix~~
  - (a) between structure and structure (here articulation)
  - (b) between the general and local vitality (general treatment followed by specific treatment).
- (2) The lack of adjustment represents a lowering of vitality, either in degree or in distribution, hence in correction we must strengthen the vitality, either:
  - (a) positively, by making it use its own power or capacity, or
  - (b) negatively, by overcoming the hindrances to the use of its power or capacity.

The vitality represents the active vital force of the organism, actively operating through the medium of the body. The vital force represents, therefore,

- (a) The sum of the vital processes through the medulla;
- (b) The sum of those relations which the tissues, organs and cells sustain to each other and to the organism as a whole, through the cerebellum and basal ganglion.

The vital processes are circulation, respiration, digestion, etc. The sum total of these represent life in the body, that is, physiological life.

The medulla is the center of all these vital processes; hence they are all closely related through the nervous system. That which underlies the vital force is the fact that all living tissues are combined together on,

- (a) The basis of a general life, and
- (b) The combined activities of these living tissues represent general vitality. Hence all change in the vitality represents some modification in the activity or in the energy of the body.

Looking at disease from this standpoint, disease represents the inability of the organism, or the organ, or its parts to perform its normal activity. All disease from this point of view represents therefore, inequality from the side of quantity, or inco-ordination from the side of quality in the distribution of the vitality in connection with the vital processes, distribution, of course, taking place through the structures.

Vitality, then, requires to take account of:

- (1) The mutual relations of all the vital processes of the body;
- (2) The independent relations in these separate vital processes, depending on the independent activity of the particular part that is affected. This depends on the sympathetic nervous system.

(3) All of the vital relations and activities of the organism look to the brain as the great center from which all order is established. This means that every part of the body has its representative in one or more of the great mass of neuron cells located in the brain. The neurone represents the unit in the nervous system. Each neurone is a simple nerve system in itself, consisting of:

- (a) A cell.
- (b) The prolongation of that cell outside of itself, called the neuraxon or axis-cylinder.
- (c) The dendrons and dendrites. These represent ramifications or branches of (a) or (b), the dendron being a fixed or stable branch, the dendrite an unstable branch.

The vitality represents the force or power which the organism has in the origination of its own activities. The continuance of the vitality depends on nutrition and this on the union of non-living elements found in the food supply, with the living tissues and cells of the body. Diet, therefore supplies the materials to sustain the body life and to produce the energy and force necessary for that body life. These materials are found in the proximate principles.

The state of nutritive health represents the normal condition of the body, of its tissues and cells. The first question is, what is vital health? The second, what is vital unhealth? To summarize the details we would state, that vital health implies five things:

- (1) The supply of the necessary food elements, sufficient in quantity and variety. Frequently the sluggishness of an organ action is due to the monotony of food, for example, in the brain or liver.
- (2) The capacity of the organs and tissues to receive the food elements.
- (3) The power of the organism through its organs to modify the food so as to prepare it for assimilation.
- (4) The adjustment of each part of the body to every other part and to the organism as a whole.
- (5) The adjustment of the functions of the different parts and of the functions of the organism as a whole.

These five things are necessary to constitute a state of vital health. What is vital unhealth? Vital unhealth is a state or condition of the organism in which there is an abnormality in one or more of the five points included under vital health. It is only a living body that can be healthy or unhealthy.

What is Disease? Disease is the effect or result produced in the organism, or in some of its parts, as the result of vital un-

health. From the standpoint of the medical doctor disease is treated as an effect and not as a condition that modifies vitality. The Osteopath deals with disease as a condition of the unhealth or with the cause producing the vital unhealth, (that is why we speak of lesions). From the Osteopathic standpoint we lay down the principle that to remove this disease we must remove the state of vital unhealth which is the cause of the disease. Disease, then, is not a separate entity differing from the body in which it is found; it is not an imaginary condition; but it is a result produced by the disordered or disorganized condition in the vitality. Germs, if they exist as germs, are not the primary cause of disease, but are the products or results of disease and the only relation they have to disease is that of contagion.

What is a lesion? A lesion is a change that takes place in adjustment of the parts of the body or its environment by virtue of which disease becomes possible, disease being possible because of some interference with some one or more of the vital processes. Lesions may be found along this line in three forms:

- (a) In the food and environment of the patient.
- (b) In structural form of the body or of its parts.
- (c) In the activities of the body representing the activities of the vital processes. Here we have the field of force.

Structural lesions are frequently secondary to functional lesions, or they may be primary.

#### THE CAUSES OF DISEASE.

Disease is always caused by some disturbing element, the disease itself being an effect or result of the state of unhealth, that is, the effect of the abnormal reaction of the vital processes. The real cause is referred to the etiology. Etiology, then, represents that which produces or has produced the disease. The etiology field is generally said to consist of three kinds of causes, namely,

- (a) Predisposing causes. The cause or conditions which puts the body or its tissues into a state that makes them subject to disease.
- (b) Disturbing or Exciting Causes. That which actually produces the disturbance in the state of vital health by irritation, for example, all types of lesions.
- (c) Pathological conditions. These are represented by a change from the normal adjustment of the organism, which give rise to the disturbance or disorder. This may be called the conditioning cause. This pathology in the field of adjustment may be of two kinds:
  - (1) A perverted vital process or activity, namely, morbid physiology;
  - (2) A change in the condition of the tissues resulting from previous perversion (No. 1) namely, the morbid histology.

Disease is an effect of vital unhealth. Disease itself may be either:

- (1) Idiopathic, that is, primary, or
- (2) Symptomatic, that is, secondary.

This means a condition resulting from another disease, e. g., atrophy of the optic nerve resulting from Bright's Disease, diabetes, cerebral hemorrhages, etc.

An idiopathic disease is one that has no preceding disease as its foundation.

This brings up the subject of Symptomatology, which represents the symptoms, signs or manifestations on the outer plane of life. These are evidences of some maladjustment and this maladjustment may be: (1) Hereditary, (2) Congenital, (3) Acquired or idiopathic.

These represent the evidences of disease upon which we depend for our knowledge of the condition of the patient and the life history of a disease. Symptoms are, therefore,

(1) Expressions of conditions of vitality. A symptom is the expression on the part of the vitality to be adjusted, that is, a desire to get back to the normal, for example, pain is always an evidence of some danger or some wrong to be righted in the system.

(2) There is always a more or less general disturbance of the organism in every case of disease. This is seen, for example, in what are called general symptoms or in the general constitutional condition of the patient, such as emaciation.

(3) We must always remember that it is the patient that is sick or diseased, not his stomach or his heart, but himself. The localized forms, as in the stomach, are expressions of some change in the condition of the patient.

The Predisposing Cause is the constitutional conditions which makes it possible for a disease to exist in the particular case. In some cases this predisposing cause is associated with the environment, climate, water, injuries, etc.

The exciting cause represents a condition which gives rise to some particular form of disease. That is why diseases are given their present names, that is, the name of the so-called existing cause is associated with the particular disease. The morbid changes that take place in disease are: (1) anatomical, representing (a) changes in structural adjustment; (b) morbid anatomy, representing resultant changes in tissues produced by the diseased condition of the patient.

(2) Physiological Changes in connection with the perversion of the functional activities, involving one or more of the functions of the body, e. g., a fever. Fever consists of four things:

- (a) a rise in temperature, that is, febrile temperature;
- (b) a reaction of some function or functions to the rise in temperature;

(c) changes in the nutritive condition; and

(d) resultant changes in the tissues which begin to break up or degenerate as a result of the excess of temperature, etc. Until we have all of these conditions there is not fever; there may be temperature.

(3) Psychological or mental perversion. Here we have:

- (a) perversions of the functions of the mind, and  
 (b) by reaction, perversions of the functions of the body in its relation to the mind. There are three fields in which we find mental disease, therefore:

- (1) Idiocy  
 (2) Imbecility  
 (3) Insanity

(1) Idiocy represents a condition in which there has never been an establishment of mentality on the normal basis by development.

(2) Imbecility represents an imperfect development of the objective mentality, that is, the mind is arrested in its development at a certain point and never develops any more; or a mind that has fully developed may be thrown down from that full development to one of the earlier stages of development, and hence appears imperfect.

(3) Insanity represents a condition in which the mental development has been normal, but the individual by some disturbance in the mental equilibrium has been thrown down to a lower plane of mentality without the absolute loss of his matured mentality.

## LESIONS.

A lesion may be defined as any variation from the normal in structure, relation or function. Lesions are classified accordingly as:

### I. OSSEOUS AND OSSEO-LIGAMENTOUS LESIONS.

(1). OSSEOUS. Here we have the alteration of a bone or ligament in relation to another bone, bones or ligaments. There are different degrees of these lesions (a) A dislocation, where we have a complete displacement and this is limited to the large bones, e. g. shoulder, hip, elbow and knee in the order of their most common occurrence; (b) A luxation, which is a partial displacement of one bone in its relation to another, or the slight movement of one bone from its adjustment in relation by articulation with another bone; (c) Supra-luxation, where we have the upper one of two bones slightly displaced, the lower one remaining fixed; (d) Sub-luxation, where the lower of two bones is moved out of its place; (e) Fracture where there is a partial or complete solution of the continuity of the bone.

(2) OSSEO-LIGAMENTOUS. Here we have an alteration in the relations of bone, ligament or cartilage. This type is more important than the purely osseous, because in every osseous lesion the ligaments and cartilages are involved, e. g., we find excessive tension, excessive relaxation, or rupture in every osseous lesion. This prevents the ligaments and cartilages from performing their original function in relation to bone. In all bone lesions, therefore, we find a ligamentous lesion, e. g., a strain, or sprain represents the loss of tenacity of the soft tissue. A good illustration of this is found in lumbago.

## II. MUSCULAR AND SOFT TISSUE LESIONS.

Of these we have four types:

(a) Contracture, that is, over-contraction. This is found where the cycle of muscular activity is modified by the increase of the contraction period and the corresponding decrease in the relaxation and rest periods.

(b) Tetanus. Here the cycle of muscular activity is modified (1) By eliminating the rest period from the cycle;  
(2) By eliminating the relaxation period from the cycle  
(3) The net result is that the cycle consists only of a series of short contractions in summation ad infinitum, etc. The only way to treat a tetanized muscle is to treat its nerve supply, for example, the spine of a syphilitic patient.

(c) Over-relaxation. Here the cycle of muscular activity is modified by marked increase in the relaxation period and marked increase in the contraction and rest periods.

(d) Rupture. Here the cycle of muscular activity is broken up by a partial or complete solution of the continuity of the muscle substance. In the ruptured strain very hot fomentations are good, because they will relax and even up opposing sets of muscles.

All muscle tissue is normally in a tonic state. This means:

(1) The reaction of the muscle to stimuli such as heat, light, cold, water, etc.

(2) The tonic muscle is in a partial state of contraction and partial relaxation, the two existing simultaneously. The living muscle is constantly passing through this cycle of changes.

(a) The cause or reason for these changes is found in the inherent force of the muscle. Myotomic theory of muscle and traction, that is, a native inherent power in the muscle which depends for regulation on the nerve force.

(b) These changes are regulated by stimulation coming from natural sources- heat, cold, light, the nervous system, etc.

(c) If the stimuli are abnormal then the muscle will be compelled to modify its cycle, and to the extent of modification of the cycle the muscle is abnormal.

(d) Each minute muscle fiber has its own minute nerve fiber and its own definite blood supply. This is the same as in reference to the organs which consist of cells. This furnishes to the muscles food, oxygen and nerve stimulus from the great centers of vitality. If the muscle is normal all these muscle fibers are normally adjusted to one another; and in the adjustment there take place certain changes:

- (a) Oxidation in the metabolic field;
- (b) Nutrition with assimilation;
- (c) The phenomena of the muscular cycle;
- (d) Chemical and electrical changes. Normal muscle is normally slightly acid. In rheumatism it is over-acid chemically.

Among the abnormal conditions that we find are variations in the inherent force of the muscle, deficiency in the nutrition, defective blood supply or nerve force. These interfere with the muscle



cycle and causeth muscle to pass into an abnormal atonic, or non-tonic state. Therefore, all muscular abnormal conditions can be classed under one or the other of these three two, namely, the atonic and the non-tonic.

FOOD  
 III. THE FIELD OF LESIONS. (ENVIRONMENT LESIONS)

The food has two functions in its relation to the body:

(1) to supply materials for alimentation, metabolism and nutrition. This means the upbuilding of new tissue and the repair of old tissue.

(2) Food acts also as a stimulus to the vital processes, that is the food, or certain parts of it, must be converted into a force, and thus it has a stimulating value to the organism, as well as a nutritive value.

Dietetics lay stress on the nourishing value of the food. The stimulating value which has been overlooked depends on the ratio of the proximate principles. Stimulus here applies to the application of the selective principles of the different tissues of the organs. Changes in the food supply alter the stimulation, e. g., an over supply of certain kinds of food will stimulate certain processes to excess.

The under supply of food materials means not only the starvation of certain tissues, but the starvation of certain side chains, which means the tendency to disintegrate within the cell; therefore these tissues must live on the substance of the other tissues. According to this, the basis of the food supply is the proximate principles. There are five great dietetic rules applicable along this line. These are mentioned here to summarize the subject of dietetics in the field of Osteopathic Principles.

(1) All the proximate principle of the body must be supplied in the food form.

(2) These proximate principles must be supplied to the body both in a digestible and assimilable form.

(3) These proximate principles must be furnished in proper proportion to one another.

The two fundamental foods are Nitrogenous and Non-Nitrogenous. They bear the following ratio to one another:  
 N : Non-N : : 1 :  $3\frac{1}{2}$  or  $4\frac{1}{2}$ . The Nitrogenous is represented by proteid; the non-nitrogenous by the other proximate principles. The daily food representing the minimum is given as follows:

|                    |                |
|--------------------|----------------|
| Proteids.....      | 130 grams      |
| Carbohydrates..... | 250- 350 grams |
| Fats.....          | 90- 100 "      |

If food is supplied on a lower scale than this the body is living on its own tissues.

(4) These proximate principles must have a proportionate relation or ratio to the total volume of the body and also to the total volume of food and water supply sufficient for the body. The minimum of water per day as a proximate principle is 20 ounces, not including the  $H_2O$  that the body makes itself.

(5) These proximate principles must be supplied in a form sufficiently varied to make them palatable and digestible and assimilable. In other words, food monotony is a condition.

In the body we find a variety of the digestive functions and secretory fluids, each calling for its particular form of food; hence it is not advisable to use one kind of food all the time. The reaction here takes place upon the secretions and, ultimately, upon the secretory organs and tissues.

#### IV. FIELD OF VITAL LESIONS.

In the organism we find the general vital force distributed throughout the organism as vital processes, and any variation in this distribution represents or produces a vital lesion, e. g., we speak of low vitality. By this we mean, negatively, not the diminution of the vital force, but, positively, a decrease in the activity of the organism or modification in its distribution. This decrease in the vitality is found: (a) in the vital centers, or organs, or (b) in some local tissue or organ.

The medium through which the vital force acts in the organism as a whole. The nervous system in general represents the field of its activity. Hence, all vital lesions affect the nervous system,

- (a) by increasing, or,
- (b) by decreasing, or,
- (c) by destroying the nerve function.

A vital lesion, consequently, results:

(1) In the loss of reaction power on the part of the organism, (reaction here meaning response.) The loss of reaction as a whole being illustrated in diseases such as diabetes, rheumatism, rickets, (constitutional diseases.)

(2) The lowering of the reaction power in the organism as a whole, expressed through the partial loss of functioning in some part of the organism, e. g., atony of the liver or stomach.

(3) The increase of the reaction power of the organism as a whole, expressed through some particular part of the body functionally, e. g., palpitation of the heart.

Any of these may result in the death of the organism, because the reaction power of the organism is so changed that it is impossible to stimulate the organism. This means that the cure of any disease depends not on the extent of the disease but on the reaction power of the organism.

(4) Increase or decrease in the local functioning of some particular part of the body. In this case, if death results, it is local death first, or gangrene, and organism death second. This is associated with the vaso-motor branch of the nervous system; ~~xxxxxxx~~ the other three conditions are associated with the nervous system in general.

The Vitality includes:

(1) Vital force or animating principle of the organism and physical force.

(2) Vital adjustment, that is, the adjustment of the different parts of the organism. This adjustment takes place

through the nervous system: We have two nervous systems that have to do with this adjustment:

(a) The Central Nervous System, that has to do with voluntary functioning, and voluntary adjustment. Here we have the field of the relation between the mind and the body, or between the mind and body and world.

(b) The Sympathetic System that has to do with their involuntary functioning, i. e., has to do with the unstriped muscle, and the visceral organs.

The co-ordination of these two nervous systems represents this vital adjustment and it takes place in the spinal cord. The adjustment at the spine is simply a means of adjustment with the spine and is adjustable by means of the minute communicating fibers, called the rami communicantes, which unite the two nervous systems. There are two types of these rami-communicantes, namely:

(1) The gray fibers, passing from the sympathetic system to the cerebro-spinal system. Only one set of these.

All these gray rami end in lateral horn cells or neuraxons of these cells representing circulation.

(2) The white fibers- two sets- from the cerebro-spinal to the sympathetic; the one set afferent, the other efferent? The weaker fibers are the gray, or sympathetic; the stronger fibers are the white fibers.

Illustration: Can have reflex distribution; have a series of reflexes between the spinal cord and sympathetic ganglion and this series of reflexes is the basis of co-ordination and adjustment. (e.g. vaso-motor treatment- articulation of 2nd dorsal to 2nd lumbar.)

The vitality uses forces and materials in all its adjustments and these are drawn from this system of co-ordination. In doing this the vital force acts as director general:

(1) in the production or supervision of finding what the organism needs, e. g., proteid taken in as a food may be changed to an acid- or an alkaline- albumin, according to the needs of the body.

This is the point that emphasizes the distinction between (1) alimentation, (2) metabolism, (3) animalization.

(2) In the distribution of the organized products, according to the needs of the different parts of the body, Here the vital forces use the body, especially the blood and the nervous system, as the media of distribution and the nervous system as the medium for finding out the needs of the different parts of the body.

(3) In the creation of new materials if the body needs them. The old idea was that the body had simply an analytical power in breaking up the food; the new and true idea is that the body has also a synthetic power, that is, the power of forming for itself a new compound when it needs it, as well as the analytical power. The synthetic power is illustrated in connection with the formation of fats, carbohydrates, acid- or alkaline- proteids, albumins, hydrochloric acid, urea, uric acid, etc., for example, fats are formed from proteid and carbohydrates, proximate principles. Physiologists take the view that fats taken into the body as fat do not form fat of the body but furnish heat and energy. Carbohydrates and proteids

are also formed in the body, or at least put in a form that represents a new construction. Another illustration is hydrochloric acid.

Another illustration of this synthetic power is found in the internal secretions of the body, such as the secretions of the thyroid and other blood forming glands, the adrenals, etc.

These internal secretions have a two-fold function in the body:

- (1) to nourish and stimulate the tissues;
- (2) to act as solvents on abnormal substances and tissues.

These internal secretions are of special value in the osteopathic treatment of tumors or growths. A tumor is an abnormal growth of tissue produced within the body, that is, it is new tissue and may be organized or unorganized. And as the body has the power of making this new tissue or growth, so also the body has the power to produce a new substance that will destroy the abnormal tissue and restore the body to its normal condition. This is done by the formation of a new acid substance to remove the alkaline tumor substance, or vice versa. In either case we must furnish the raw materials out of which the glands of the body may form this new secretion.

An external secretion is thrown out through a duct that secretes it. An internal secretion is one that is thrown out directly into the blood, for example, in the ~~gall~~ liver we have the bile, an external secretion, and the glycogen, an internal secretion.

The vitality may be disturbed:

- (1) In its local distribution. Here we have the lowering of the vitality in a particular part of the body:
  - (a) by cutting off the blood supply, or,
  - (b) by cutting off the nerve supply.

In both cases partial death is produced, for example, leprosy, a curable condition, represents a partial death of a portion of the body. All skin diseases also are illustrations, because they are nervous diseases. Another illustration is localized tuberculosis. This is a partial death of a particular portion of living tissue and it is curable by establishing the normal conditions of vitality, if these conditions can be established in the particular case.

(2) Vitality may be disturbed by the disturbance of its adjustment through the nervous system. The result of this disturbance is what we call the neurosis, for example, Diabetes.

(3) The vitality may be disturbed by the existence and action of foreign substances or organisms within the body organism:

- (a) Foreign Substances including,
  - (1) Toxic substances, that is, poisonous in their nature, whether formed in the body as endotoxins or taken in as poisons.
  - (2) Septic substances, that is, poison generated by the system itself as a result of degenerative changes. Here we have self poisoning.

The only way to treat a toxic condition is to antidote the poison. Here osteopathy admits substances that fall within the realm of toxicology. In the septic state, that is, when the body has poisoned itself, the body will produce its own antiseptic, if it is properly treated. Here the antiseptic exists in or is produced by the body it-

self. In case of organic weakness the antiseptic may have to be supplied.

(b) Foreign Organisms, or Micro-organisms. These are foreign bodies or cells trying to gain an entrance into the organism. These germs are always a part of the environment of the body, but will gain an entrance into the body only when the organism or its vitality is disturbed. Dead germs are more deadly than living germs because the toxin of the dead germ inoculates the organism, for example, in boiled water we have the toxin of the dead germ- the germ is in the water unless it is rendered innocuous. When the body is normal the germ will pass through the body without gaining entrance. Distilled water is not good because it breaks up the corpuscles of the blood.

In dealing with germs from the osteopathic standpoint the method is to destroy the germ if this is possible. If a germicide exists it is osteopathic to use it. If this is not possible then we try to expel them from the organism. The method used in expelling the germs is to use the germicidal properties of the blood, because the blood purifies the system, defends the tissues from intoxication, and if it is absolutely pure, has the power of killing the germs. Pure blood is both venous and arterial, that is, it is standard blood, or blood up to normal where it is circulated, that is, normal venous blood in the lungs, normal arterial blood in the system tissues. In dealing with the blood two things are necessary, osteopathically:

(1) The production of more blood (a) by stimulating the lymphatic glands; (b) by stimulating the blood forming glands and (c) by distributing it more quickly and more generally through the system, from the side of the circulation.

(2) Try to build up the nutritive condition of the rest of the body. That is, stimulate the native tissue cells. The two types of native tissue cells to be stirred up are: (a) The leucocytes. One of the specific functions of these is to act the part of phagocytes, that is, eaters up of germs; (b) connective tissue cells. (Osler). These cells are found in the different glands and connective tissues of the body. They destroy the germs by forming an anti-germ substance. Leucocytosis is an actual fight between life and life. (c) The leucocytes other than the phagocyte, has the function of destroying the germ by preparing an anti-toxin in the form of a secretion. If the germ gets this anti-toxin prepared by the leucocyte it will be killed, or at least rendered lethargic, and thus prepared for destruction.

(3) Try to rid the organism of the products of the germs. These are found in the forms of toxins (endotoxins) causing results such as headaches, increase of temperature, toxemia, dizziness, nausea, etc. To free the system of these toxins, or endotoxins, the osteopathic treatment is directed,

(a) To open up the excreting systems of the organism, such as the skin, sweat, urinary excretions, etc.

(b) By reducing the temperature if a scientific, physiological method. This is done by taking away the heat from the body, e. g., by osteopathic treatment, the hot sponge bath, the cold sponge bath, alcohol rubs,

etc. If the patient is perspiring freely use the tepid instead of the cold water sponge bath in order to remove sweat and toxins from the skin.

In dealing with the sweat system the main points are as follows:

The great center for treatment in the sweat system is located along in connection with the lymphatic system at the anterior transverse processes of the 5th, 6th and 7th cervical vertebrae. The regional centers for the upper half of the body are located in the lower cervical and the upper dorsal; for the lower half of the body at the lower dorsal and upper lumbar. The point of division in the trunk is at the 9th dorsal.

(c) Stimulation of the circulation of the blood so as to get as rapid circulation as possible. The points of application are

(1) at the great center for co-ordinating the deep and superficial circulations at the 3rd, 4th and 5th dorsal; (2) Stimulation of the local centers corresponding with the seat of germ action, that is, in tuberculosis of the lungs the local centers are from the 3rd to the 7th dorsal. The local centers here are vaso-motor centers. Suppose you are dealing with tuberculosis of the hip joint. Here you get the centers located at the sacro-sciatic plexus region from the 3rd lumbar to the 3rd or 4th sacral.

(d) The use of germicides, if any such exist. When are they to be used? Only when the organism is too weak to resist, so that the use of such germicides in removing an obstruction to recovery will materially assist to conserve the strength of the patient.

The field of Osteopathy, then, is the field of lesions, if the term lesion is properly understood. The lesion is the change in adjustment in structure from the side of articulation, in activity from the side of mobility that is fundamental to all living structure, or in the conditions and environments of living structure. The vital force is distributed in connection with vital processes called functions in physiology. These vital processes depend for their expression and for the functional actions they perform upon activities. These activities depend upon mobility and the primary form of all such activity peristaltic action and rhythmic action. Any modification in these activities is liable to result in lack of correlation and this in turn produces an organic disorder.

According to this view, all diseases are due to or associated with (1) mechanical obstruction, such as crude lesions of tissue or microscopic lesions of the cells, producing a condition of the system, or its parts, that may be characterized as an effect of the obstruction; (2) toxic conditions, such as specific poisons produced in the system, such as syphilis and gonorrhoea, poisons from the food or formed in the food. Here the same principle of adjustment is applied, but from a different therapeutic standpoint; (3) surgical lesions of strain, sprain, fracture, solution of continuity of tissue. Here the same principle of therapeutic adjustment is applied both in the minor and major surgical field, a part or organ of the body being removed when it becomes dangerous to the organic life,

threatens the organism with destruction or tends to produce an unbearable degree of suffering that can be relieved by operative means.

The fundamental principle, then, is maladjustment in disease and adjustment in health- the adjustment as we have seen being anatomic, physiologic, psychic and environmental.

### T H E R A P E U T I C S .

Therapeutics, as previously defined, represents a system that has a curative capabilities. This may be (1) preventive, (2) palliative or (3) curative proper. In any case- in every case- the prime object is to do for the patient the best that the most advanced science can suggest, with the existing vital conditions of the patient, as we find them, that is, the principle of all the subdivisions of therapeutics to resist the resisting powers of the organism.

Therapeutics means a system of science of healing by means of which diseases may be prevented, aborted or cured. As a system the Osteopathic science claims to be able to do what is included in those three departments, namely, prevent, abort and cure.

At the foundation of all means used to prevent, abort or cure diseases we find certain fundamental principles. These, it is well to state explicitly:

(1) All living matter sustains itself by means of certain changes that take place within the organism. All these changes are regulated from within. All outward, or external conditions are expressions of the within. Huxley says "the material organism ~~organism~~ body consists simply of a flux of molecules from without in, and from within out." Huxley said that the continuance of the material life consisted of (a) the flux of nutritive substances from without in and from within out; and (b) psychic, consists of certain expressions of sensation or impression from without in and then from within out. Life begins from within and its manifestations in the body is a constructive process, the life within determining all the changes that take place in the life without the body. The cell is the unit of life and the center of the cell being the nucleus, therefore, the smallest expression of life in relation to the body organism is the nucleus of the cell. A body is simply the multiplicity of these nuclei and their correlation in the field of substance. Everything that comes into this cell from without must follow the cycles of stomatic construction until it reaches the nucleus. It is the nucleus that determines what will be received and what rejected. Whatever is not accepted is sent back along the path by which it came into the center of the cell and is thrown out.

(2) The living organism as a whole and the independent cells that make up the organism have the property of irritability. Irritability is the power of responding to external stimulus and so long as the body and its cells are alive this power is present. When irritability is lost in the body or its cells the body or its cells

are dead. All healing implies the presence and existence of this power of irritability and the healing appeals to the organism through this power of irritability. That is, unless the organism has the power of reacting to a treatment the treatment is of no value to the organism.

Anything in the form of a substance, remedy, agent or other means which can reach this property has the power of altering the irritability and may therefore have a therapeutic effect. In the medicinal field this is done entirely through some substance, either chemical or potential and in the osteopathic field the method used is the physiological-mechanical,

- (a) To increase or intensify the irritability. This is technically called stimulation, more strictly, however, acceleration, leaving the word stimulation as the generic word, that is, here we have simply the reaction of the organism or part of it to stimulus, the stimulus being the treatment.
- (b) To retard, lessen or check the irritability. This is called inhibition, while the primary purpose of a treatment may be neither to accelerate nor to retard, the net result of treatment is always the one or the other, because, as we shall see later, inhibition is one of the vital phenomena. Acceleration is simply the overbearing of vital inhibition. This may be done by corrective work, that is, the vital phenomena represent a cycle. One part of the cycle is inhibition, the reaction from the inhibition is acceleration and the net result of both inhibition and acceleration is STIMULATION.

(3) The living organism has the power of regeneration and reproduction, not as two separate powers, but as a single vital characteristic. In this field we find two great functions that lie at the foundation of nutrition:

- (a) Here we find an addition to or modification of the substance of the organism by upbuilding or repairing. This is called regeneration, therefore, it is a renewal process.
- (b) The change in nutrition that implies the formation of new cells preparatory to the production of an independent form of life. This is called reproduction.

The generative power depends upon the nutritive processes. Certain parts of the body cannot be regenerated. The process of reproduction also represents nutritive conditions, that is, it is simply nutrition carried to the point where there is the formation of an independent cell life and that independent cell life is the beginning of a new organic life.

(4) All the changes that take place within the organism represent nutrition changes. The medium through which these nutritive changes take place is the irritability of the organism, that is, subject to stimulation. That which controls all these changes in the general vitality. This means that all nutritive changes call for a continued adjustment, the adjustment being determined through vitality which means the nervous system. Within the nervous system we find



a mass of neurones. All treatment, therefore, appeals in some way to these neurones. In reaching these neurones:

- (a) There is the correction of some lesion (osseous, muscular, ligamentous or cellular). The part that is corrected begins to discharge its normal functions through the nerve and blood fields. These normal functions act as stimuli to the nerve cells, arousing the irritability of the cell. The result is a stream of impulses with normalizing influences passing to the part affected, hence the nerve cells modify the part affected or condition that is affected or abnormal tendency to or restoring to normal.
- (b) Inhibition along some nerve path, blood channel, muscle, or soft tissue substance, checks the flow of impulses, the result being that over activity is checked, the stream of impulses is lessened and the tissues are soothed, for example, pain, at least in one of its forms is an increased activity of the tissues and inhibition checks the activity and lessens or removes the pain.
- (c) The stimulation of some path or field where soft tissue is found causes an increase in the activity of the tissue or in the fluid circulating through the tissue, or in the force of which the tissue is the medium of conduction. Hence stimulation specifically arouses rhythmic activity in the tissues or organs that are torpid or sluggish, that is, increases the flow of the fluid to and from the tissues or makes the tissues more conductile.

(5) The osteopathic foundation of therapeutics is physiological, physics and animal-mechanics, along the same lines as any other therapeutic system. The fundamental principle that underlies this therapeutics is that physics and animal mechanics of the body are vital, that is, the mechanical or physical (a) phenomena of the vitality; (b) the mechanical and physical forces and changes of the organism can be converted into their physiological equivalents. The chemistry of the body is vital chemistry; so the physics of the body is vital physics.

Stimulation arouses rhythmic activity of a part.

Inhibition checks rhythmic activity of a part.

#### PHYSICAL SIDE OF THERAPEUTICS.

We find many illustrations of these physical and mechanical principles in connection with the body:

- (a) The principle of leverage, found in connection with the attitudes of the parts of the body and the movements of the arms and legs.
- (b) The pumping force in connection with the heart and small lymphatic glands. In the heart we have an illustration of the two kinds of pumps, (1) the force pump on the left side of the heart, controlling the arterial, or systemic, circulation on the return side; (2) the suction pump, on the right side of the heart, controlling the venous circulation by a pulling or negative pressure or force action. Intra-thoracic negative pressure, pressure in the vacuum of

thorax, the vacuum pressure of the abdominal and pelvic cavities;

(c) Pulley action, found chiefly in connection with the superior oblique muscle of the eye involved in eye strain, for example, astigmatism.

(d) Pressure force, found (1) in connection with the gases in the respiratory field. The law that governs the interchange of gases is the law of partial pressure according to which each gas exchanges on the basis of its pressure per unit volume. (2) In connection with the positive and negative pressure of the blood. Blood pressure is to be distinguished from arterial tension, which is the tone or tension of the arterial walls. This tone in the walls represents the tonic state and to this tension the blood volume offers a certain resistance which is technically called the blood pressure. These are the two physical factors which determine the forward circulation of the blood.

(3) Pressure in connection with the rhythmic action of tissues, organs or cavities. Here we mean negative pressure. In all the organs and cavities of the body there is a partial vacuum, that is, the pressure there is below the atmospheric pressure and that pressure is subject to variation, for example, intra-thoracic negative pressure. The right side of the heart is thinner, etc. but nevertheless it is stronger from the pressure side than the left side.

(e) The valves, found in connection with the veins controlling the blood flow, also found in the heart and at the junction of the systemic arterial system with the heart. The heart is divided into two and each of these two is subdivided by means of valves duplicating the functional activity of the heart.

(f) Mobility. This is found both in a passive and active form; in connection with the life forces it is in the active; in the passive form it is found as the result of active movements. This force of mobility is the foundation of all motion and locomotion, hence it has to do with:

(1) The bones, as the solid structural elements of the body.

(2) With the ligaments and cartilages, as the semi-soft tissues which form the osseo-ligamentous articulations. *Kinky-Ankylosis* secondary to rheumatism. Rheumatism of ligaments an illustration of this type.

(3) In the muscular system, which represents the power of capacity to move the articulation, either reflexly or voluntarily.

These three conditions are essential to every movement of the body or its parts, to maintain the erect posture of the body and to cause variations in the erect posture in the physical exercise of walking, running, stooping, etc., i.e. locomotion, whether fast or slow.

- (g) Certain physical principles are found in connection with the organism, e. g. heat, energy, force, momentum. Gravity represents a physical attraction pressure and tension a physical opposition in connection with certain of the tissues, e. g., the muscles, blood vessels, etc. Gas pressure we find in connection with the lungs and tissues. Light we find inherent in the eye. All of the kinds of electricity are found in the body, e. g., frictional electricity, generated by friction between the tissues and friction among the corpuscles. The regular current electricity in positive and negative conditions of the body tissues. One of the great functions of the body is to transform one physical force into another and to translate the physical force into physiological activity, e. g., light is transformed into ~~vision~~ vision, electricity into heat and energy and vice versa.

The physical law is the law that regulates assimilation, namely, one atom is attracted to and selected by another atom. The law that regulates the forces of the body is the same that regulates physical forces in nature; it is called sometimes the law of the conservation of energy. According to this law there is nothing that is lost, but in passing through changes there is simply a change in form; hence in the changes that take place in the forces of nature there is simply a change in the mode of activity.

(6) The power that guides these changes in the field of animated nature is the vitality operating, in the case of the human body, through its irritability. This means that the animated mechanism is a combination:

- (a) Of material substance subject to the law of universal nature;
- (b) Of physical forces, and
- (c) Of the vitality. The vitality is the immediate and ultimate moving power. The physical force is the immediate moving power, and the material substance is the machinery operated on by the vitality.

The mechanics of the body represent, therefore, the machinery and the apparatus and organism in action and life is the manifestation of certain phenomena in connection with a cycle of changes. This cycle may be said to consist of:

- (1) Adjustment,
- (2) Non-adjustment, that is, opposition or antagonism to adjustment.
- (3) Readjustment.

In this cycle of changes the vitality is the controlling factor, the body and its parts the machinery and the apparatus. If the apparatus become improperly adjusted to each other, or to the whole machinery, the vitality has not the proper field for its manifestation. The result of this is what we call disease or a diseased condition of the organism. In the vital machine we have a physical force, the vital force, which is exactly on the same plane as heat, light, sound, electricity, etc.

Force may be defined as anything that causes change or destroys motion or rest. In this sense the vital force is a physical force, subject to all the influences that modify other forces; according to this, anything that modifies or affects for good the physical force of the body belongs to the domain of osteopathic therapeutics. For example, if water is of service in modifying the force of the body, then water is a part of or belongs to the field of osteopathic therapeutics.

(7) Physical forces in connection with the organism furnish the foundation for the activities of the vitality. All of these changes that take place in the body may be classified under three heads:

- (1) Nutrition, that is, the formation of tissue and its repair from time to time as a purely nutritive process.
- (2) Regeneration, that is, the formation and repair of tissue consequent upon degenerative changes in the tissues.
- (3) Reproduction, that is, the formation of a new form of organic life.

Regeneration may be either partial or complete. If partial the change is going on all the time in the repair processes of the tissues; if complete, there is a reintegration of the certain tissues or parts of the body that have been previously degenerated. In the field of the nervous system this process is limited to that part of the nervous system that lies outside of the central nervous system. If degeneration has taken place inside of the central nervous system, the condition is incurable, for example, in locomotor ataxia, when the degeneration extends into the central nervous system, recovery is impossible.

Reproduction is either partial or complete; partial in relation to the simple cell on the basis of asexual reproduction; complete in relation to the organism as a whole on the sexual basis. Each cell in the body is a living animal and the process of reproduction in that cell is called by histology, cell-division. This means that the cell divides its own life and substance to form new cells. The reproduction of the organism as a whole on the sexual basis may be either diffusive or centralized; diffusive in the lower animals, e. g., the earth worm, polypus, etc.

Centralized vitality represents that vitality which has one great center in the body. When separated from that center the part ceases to live, e. g. an amputated arm dies because it has been cut off from the center of life or vitality. The higher the form of life the greater the centralization and the less the power of reproduction in the separate parts of the body. This means that the principle of reproduction is the highest is more centralized.

The control of regeneration and reproduction takes place through the nervous system. All parts of the body may degenerate, but all parts of the body do not regenerate. This is especially true of the central nervous system, probably because it is nearer to the centers of life? In the central nervous system we have the highest degree of refinement in life and the power of reaction for the entire organism. The higher the living substance the less the power of regeneration. This means that the nerve cells cannot be regenerated as they represent the highest form of living development. This means that the centralization of life is in the central nervous system.

The great question, therefore, in osteopathic therapeutics, is, CAN WE, and HOW can we control the central nervous system?

In the correction of lesions in the structure of the body we can correct so as to give the central nervous system the control of the body. This gives us a therapeutic result on the diseased condition of the body or its parts. In order to reach the central nervous system to stimulate the process of regeneration we must reach the nervous cells because these are the centers of the life processes. These cells are located principally in the brain and spinal cord. Osteopathically we reach these cells and influence the vitality associated with them,

- (1) By the correction of some lesion in the structure or some maladjustment of tissue, such as bone, cartilage or muscle, or by the correction of some functional activity, that is, a structural activity that determines function. If the function is corrected or the functional activity is adjusted:
  - (a) The nerve and blood supply will be or becomes normal, in the volume, distribution and force.
  - (b) These normal functionings of the nerve and blood supply will act as a stimulus to the neuron cells, arousing the property of irritability and causing this to react upon the portion of the organism that are abnormal. (Part of Billogy which is liable to be forgotten. Remember that nerve and blood supply may be normal and yet blood may be in an abnormal condition. Why? Therefore the central nervous system is dependent entirely on sensory stimuli for its activity.

Action in the therapeutic as well as the physiological field is of value only in so far as it produces reaction. The result of the action and the reaction is that a stream of normalizing impulses passes out to the organism parts that are abnormal and tends to bring them back to normal.

- (2) We can reach the neuron cells by inhibition along some nerve or muscle or blood path, the object here being to check an over-activity. To lessen the stream of impulses that has been diverted from its normal path so as to cause the equable distribution of the nerve impulses, e. g., diarrhoea in some of its types represents a physiological condition of some part of the intestine in which there is present over-activity of peristaltic action, the increased activity causing pain, if pain is present, increased secretion or serum exudation and increased evacuation.

Diarrhoea can be controlled, aside from the correction of lesions or irritation, by inhibition at the 10th, 11th and 12th dorsal inn the vaso-motor type; at the 1st, 2nd and 3rd lumbar and in the sacral region in the secretory type. The result is to cut off the irritating impulses and allot the intestine to resume its normal activity, whether it is peristaltic, secretory or vaso-motor.

In the secretory type the conditions present are painless; evacuations contain mucous, etc.

In the motor type; painful, evacuations appear normal, are normal in consistency but occur oftener than normal.

In the vaso-motor type- painful or not; evacuations very thin and watery. The blood is involved in this type and it is serum that is exudated, e.g. in the watery discharges of cholera.

In the secretory type there is a lymphoid fluid evacuation representing lymph excretion, e. g. in the diarrhoea of liver nœclic, the liver pain reacting on the lymphatic system and opening up the lymph elimination.

In the pain that we find in the stomach caused by distension from gas we have an over-stimulation of the sensory nerves from the stomach. In the pain of some malignant disease, e. g. cancer of the stomach, it can be controlled by inhibition at the 4th, 5th and 6th dorsal, the reaction being the cutting off of the irritation impulses passing from the stomach to the sensorium of the brain.

Pain produced by tumors, e. g. spasms of the muscles in the abdomen, in the extremities, can be controlled similarly by inhibition along the spine at the corresponding point, that is, according to the organ or part involved. In controlling pain it is at the sensory center that inhibition is to be applied.

- (3) We can reach the neurons by stimulating along the part of some soft tissue, e. g., muscle, nerve tissue, blood. The stimulation is applied by the moving pressure and the object of the moving pressure is to arouse the irritability of the tissue, for example, if a tissue is inactive, either partially or completely, stimulation is applied to the tissue and its nerve and blood supply to arouse them to activity. For example, we can stimulate the liver to activity at the 8th, 9th and 10th dorsal, over the cartilages of the 8th and 9th ribs, at the sternum, and by treating the ribs themselves, giving what is called elastic treatment. When the liver is inactive we can arouse it to activity in three ways:

- (a) By direct stimulation of the liver itself, a vibratory treatment or movement being best and this is best for any organ that has rhythm, vibration being given by hand or fingers over the liver and the ribs.
- (b) Direct stimulation to the portal circulation. Get below the stomach and push upwards, applying stimulation slightly to the left of the median line.
- (c) Stimulation of liver from 8th to 10th dorsal on the right side. Here we catch the nerves from the spine to the liver.

- (4) Sometimes the best method of reaching the neuron cells is by rhythmic treatment, that is, alternate inhibition and stimulation or vice versa. This is applied particularly to those organs that have a rhythmic activity, such as heart, liver, spleen or the organs which have a double nerve supply, such as heart and intestines. For example, supposing the heart stops beating, a rhythmic treatment is the only kind of treatment to give in this case, because we can never depend on a single nerve action in the case of the heart or intestine. We require to use both inhibition and stimulation in alternation.

If the heart stops in diastole you must start it up in diastole. Therefore apply inhibition and then stimulation. To get control of the heart then inhibit the pneumogastric. The best point to get such control is at the middle of the neck along the carotid sheath; to the lungs at the atlas and under the clavicle. Inhibit the pneumogastric and then stimulate the accelerators to the heart, that is, the middle cervical ganglion. If the heart stops in systole you still have respiration; if it stops in diastole you have no respiration. To lessen the rapidity of the HEART inhibit and then stimulate and keep up in alternation until you get results. Such treatment is, of course, palliative, but the reaction from such treatment is corrective.

To increase the rapidity, where the rate is slow but the rhythm regular, first inhibit to get control and then stimulate in continuity. If there is a tendency in this latter case to intermittency inhibit periodically while giving the stimulation. (This type of treatment where heart has been stopped.) In treating the heart when it is weak in action, the rule is to keep as far away from the heart as possible. For example, this is the principle involved in rectal dilatation. This affects the ganglion impar.

In the intestines the two nervous systems cross each other giving us what is called a double crossed innervation, the one sympathetic, and the other cerebro-spinal.

- (5) We can reach the neuron cells by co-ordinating the forces and the functional activities of the organism. Here we use the principles of physiological physics, e. g. the pump, leverage, etc. principles. These forces are in themselves passive and require to be made active in connection with the stimulation of the vital power. The best way to reach these vital powers from the physical point of view is through vibration, i. e., the application of physical vibration to the body or parts of the body, e. g., to the brain through the cranium to stir up dormant potential activity. Over the lungs, heart and liver for the same purpose. All kinds of vibration can be applied to the body either by the hand or by a properly adjusted mechanical apparatus. The principle point in the mechanical vibrator is to get the horizontal, circular vibrator rather than the vertical vibrator. In my own experience hand vibration has been sufficient, but if others choose to use the mechanical to save himself energy there is no objection.

Vibration appeals to the vibrability of the organ and tissue and it arouses the irritable mobility which lies at the foundation of tissue vitality. Vibration is one of the powerful means of osteopathic treatment, especially where there is congestion, paralysis and pain. In the application of these methods we must remember that the body possesses irritability. This property depends on the life energy that is stored up in the neuron cells. The non-vital mechanism does not possess irritability, but simply has the power of converting substances furnished as raw material into heat and energy, liberating life energy from the cell and distributing it along the nervous system. In the human system irritability implies variability and the variability-

ty is determined:

- (a) By the relations of the muscles to the neuron cells, and
- (b) By the relation of muscle and neuron cell in combination as apparatus to the life energy.

Life energy covers both the subjective and the objective fields. The muscle represents the apparatus used by the life energy so that the muscles are the instruments of executing the will of the nerve centers in the cerebro-spinal system. The neuron cell is the generator and distributor of the life energy; hence the neuron cells constantly stimulates the muscle to perform its work. The life energy is constantly going out from the nerve cells in the form of impulses. These impulses are found in the form of vibratility, just as an impulse from the physical standpoint passes in the form of vibratile waves. The nerve impulses pass in streams as currents, wave following wave in the continuity of the distribution of the nerve forces.

The muscles in doing their work under the stimulus of the nerve cells also have vibratile waves passing along the muscle path. In the voluntary muscles these waves are rhythmic. In the involuntary muscles they are arrhythmic; that is, in the heart we have rhythmic vibrations passing from auricles to ventricles, and arrhythmic vibration along the muscle substance of both auricle and ventricle. In the intestines we find the typical arrhythmic vibration called peristalsis or peristaltic action. These two types of activity represent the foundation principles of organ, nerve and muscle activities. Whenever these vibratile waves are interfered with or exaggerated the tissue or organ is in an abnormal state, e. g., a chill is simply an explosion of the excessive energy stored up in the nerve cell or a series of cells. The explosion takes place so rapidly that the muscular system is unable to receive the impulses as rapidly as they are sent out, with the result that there is trembling.

The only way to check the chill osteopathically is by soothing the nervous system, for example, by inhibition. A spasm of convulsion is almost the same as a chill, the difference being that in the latter case the convulsion or spasm is limited to one particular set or group of muscles; for example, in the convulsions of teething, relax the muscles around the head, neck, face and the dorsal region on the spine, to control the spasm.

(8) BODY ECONOMY. The body economy is produced by nature and is brought about by the internal connections established between the different parts of the nervous system as all are adapted to their own particular kind of activity. Nature makes a distribution of labor so that each muscle will have a share in the work of the body as a mechanism, for example, the large muscles are capable of great activity; hence the amount of the work that is done by the muscle is said to be in proportion to its length and its cross section area. If the muscle is thick and short great activity is possible because the range of its activity is limited. If the muscle is thin and long, the action is feeble, although it may represent in the long run strength because the muscular action is added to its attachment to the bone; for example, in the pector muscle we have feeble action, hence this



muscle is liable to give way when it is over-stimulated. The sartorius muscle is comparatively feeble in itself, but in relation to its bone attachment it is strong. The sterno-mastoid muscle is strong also because of its attachments.

All these muscles when contracted are liable to refuse to work and this refusal results in the derangement in the muscular economy as well as disturbance of organs, pressure on or irritation of nerves, blood vessels, etc. The normal stimulus of the muscles comes from the nervous system; hence each muscle and muscle fiber has its own nerve supply so that in distribution of stimuli each part of the muscle receives its own share of the stimulation. The nerve fiber enters the muscle at the equator of the muscle and the impulses are distributed to the fibers from this point, that is, from the equator the impulses pass in waves towards the ends of the muscle. Hence when giving inhibition or stimulation to a muscle begin at the equator or center of the muscle, this being the point where both the nerve and blood supply enters the muscle. This is the main point that we get from the economic division of the muscles fibers and from the nerve supply in connection with the fibers. The main object of the treatment at the center of the muscle and going toward the end of the muscle is to cause the muscle throughout its entire length to react, so that the muscle may resume economic relations with other muscles.

from the standpoint of body economy in the nervous system we find a similar economy more definitely differentiated. The nervous system is generally divided into two parts - afferent and efferent sides - the motor and sensory sides, applied both to the cells and the fibers.

The sensory part of the nervous system has as its special function from the standpoint of body economy, picking up the stimuli from the muscles and sensory terminals on the interior or exterior surfaces of the body. Muscles and end organs representing the receptive organs that transform stimuli into nerve vibration or nerve energy, of what is commonly spoken of in physiology as nerve conduction.

The motor side of the nervous system has as its special function the carrying of impulses or nerve conduction from the nerve cells or centers to the muscles for distribution in connection with motion and locomotion as powers of the organism.

The most important part of the nervous system is the nerve cell because it represents the unit in the economy of the nervous system and also the unit of the generation and distribution of the life forces.

The cells or groups of cells is the center of origin, manifestation and distribution of the life forces in the form of nerve impulses.

The nerve fiber distinguished from the nerve cell is represented by the neuraxon and the branches of the cell and neuraxon. These fibers are media through which cell communicates with some other types of tissue, for example, muscle, epithelium, mucous membrane, skin, etc. The only function that the nerve fiber has, therefore, is to form a pathway for the life energy as it moves to and from the cell. The neuraxon is the main path because it is really continuous with, and a part of, the cell structure. The dendron is closely connected structurally with the nervous system or both extremities. The

~~dendron-is-closely~~

dendrite has only unstable connection, the proximate end being able to establish connection at the will of the dendrite. This power is not possessed by the neuraxon and dendron, therefore the dendrite is really the free feeler to the nervous system, that is, the associations of the nervous system are based on the dendrites. In this sense all our psychological development depends on the dendrites.

This means that the nerve fibers have no special function in themselves, excepting transmission and connection and these are determined by the cells to the fibers attached. They are living only insofar as they are stimulated by the life energy in the nervous system. The structure of the fiber may not give it any help in determining the function because all fibers are practically the same in structure.

In the nervous system we have to deal with two types of cells:

- (1) Embryonic cells, and
- (2) Mature cells - gang cells.

The embryonic cell has as its main function the absorption of nutrition.

The mature cell has a double function: (a) Its main function is to act as a medium for the distribution of cell energy; heat distribution also; to every part of the body.

There is no part of the body that is not supplied by some form of nerve fiber because there is no other medium through which the life energy transformed into cell energy can be distributed.

Sickness or unhealth represents the one of two things, lack of distribution either (a) or life energy or (b) lack of distribution of cell energy; for example, produced by some form of obstruction. The important point is that this distribution takes place in and from the cell, consequently sickness or unhealth brings us back to some obstructive condition of the cell.

This statement we make specifically, because the general teaching of osteopathic writers is the reverse, e. g., it is said that the cell has nothing to do with the lesion or its disturbance as far as the disease is concerned. There may be faulty metabolism of the cell or of the structure of the cell, but that is due, it is said, to some conditions of the body.

But in origin the condition is first specific and local, then later on more general. The specific origin is in the cell because the cell is the unit of life and energy both in health and disease. When we speak, for example, of stimulating or inhibiting the nerve we are aiming at the cell, that is, we use the fiber as the only pathway by which we can reach the cell. The same thing is true of the muscle cell or fiber. This implies three osteopathic principles:

(1) The Stimulation (a) of the vitality, (b) of the food supply, (c) of the oxygen supply as the trinity of operations at the fundamental basis of organic life.

(2) Some definite result produces in connection with the actual production of life forces or energy is essential in dealing with the body organism.

(3) The distribution of the life forces is the field of therapeutics; obstruction to this distribution is the field of lesions and the correction of these obstructions is the field of healing.

These are the three points that are always subject to influence as a result of Osteopathic treatment. We can always stimulate the vitality to the assimilation of the food supplies (food here including oxygen. Also we can stimulate the processes of the life forces by affecting the fibers of the cell as the center from which distribution takes place.

This explains a large number of cases with which we have to deal, for example, cancer is simply that condition of a particular tissue in which the embryonic cell ceases to discharge its own function and begins to develop after the other cells (mature cells) ceased to grow, the body having reached its maturity. This explains why cancer is found as the body begins to decline, THE EMBRYONIC cells being always present absorbing nutrition, the mature cells ceasing to grow, the embryonic cells then begin to grow and form an abnormal growth that we call cancer.

The Primary Muscle Cell is developed by elongation into a muscle fiber. In origin the muscle cell is like the other in the body, but in development the cell becomes elongated in the formation of tissue. The fiber development of muscle follows closely the development of the nervous system, each fiber in the muscle having its own nerve filament. The muscles follow the nerve also in repair of the cells by a process of development, the nervous system determining the processes that form regeneration. Fiber formation, therefore, is a differentiation process in connection with tissue development. What determined the change from the cell to the fiber? It is determined by the development of the nervous system. Here the origin of the question as to inherent force in the muscles. There is in connection with its cell development that inherent force as regulated by the nervous system when the cell changes to the fiber. Inherent force is a cell characteristic; ? force is a fiber characteristic. For this reason, from the osteopathic standpoint, we pay particular attention to the nerve centers. This represents one difference between osteopathy and massage, the latter being based on the muscle treatment, the former on the nerve center, the nerve fiber being used as a means of reaching the center. This depends on the general principle that is laid down as follows: "Every life force develops from within." In the application of this principle to the muscle, if the muscle is deficient in life force, we have muscular atrophy, hence the objects of the treatment are

- (1) to supply these parts with needed nutrition through the blood, and
- (2) at the same time to make the nerve act upon the muscle in such a way as to make the muscle assimilate nutrition. Nerve force lies, therefore, at the foundation of a healthy muscular state.

The body consists of two main soft tissue systems, the nerve system and the muscle system, leaving the solid framework of the body, such as bone, with the ligaments and the softer tissue,

like fascia, as accessory. In the nerve tissue we have the cell function of the master tissue of the body because it is the tissue that directs and controls all the other tissues. In the muscle system we have the fiber structure and function which means nutrition plus nerve force action; that is, nutritive substance plus the organizing force of the nerve cell function.

At the same time when the muscle and nerves develop as tissues they have certain properties in common, for example, physical properties are the same, differing only in degree. There are three physical properties, namely:

- (1) Consistency, that is, the amount of fluidity or solidity, for example, muscle more solid than nerve;
- (2) Cohesion, that is, the power which the different molecular atoms in the tissue have to attract one another, for example, one drop of  $H_2O$  will stick together, two drops of  $H_2O$  will not, because there are two cohesions. Solid matter sticks together better than fluid, because there is greater cohesion in the atoms. Therefore, in muscle we have greater cohesion than in nerve.
- (3) Extensibility and elasticity, that is the power of elongation under traction and the power to return to normal again by elasticity.

These physical properties we find within muscle and nerve.

Chemical properties are different in muscle and nerve.

In nerve tissue the chemical properties depend on two main substances, (a) nuclein, that is, a phosphorized proteid, that is, proteid in which a large element of phosphorus is found; (b) protogon, consisting of cholesterol, lecithin (lecithin is basis of lecithins- Tyroid substances of Nissl) and cerebrin. This protogon represents a glycerated proteid in connection with a fatty medium, and this is why fat is essential in nerve nutrition of nerve tissue; therefore, here you have the nutrition of proteid (a) being the combustible side of proteid. The elements developed in nerve tissue are all developed from (b) butter, cream, mutton fat, olive oil. Note here that the protogon is the basis of conductivity.

The physiological properties of nerve tissue are:

- (1) Mobility, that is, the power of movement found in all bioplasm, for example, amoeba;
- (2) Irritability, that is, power of responding to a stimulus. This is the differential property of tissue, that is, the bioplasm when specialized takes on a tissue form. The bioplasm is specialized as tissue where we have the properties, mobility with added irritability, for example, in the amoeba we have mobility without irritability; in nerve tissue, mobility with irritability;
- (3) Conductivity, that is, the power of transmitting impulses.
- (4) Excitability, that is, the power of the nervous system to be excited by an irritant at any point in the nerve tissue substance.

The vital properties of nerve tissue are:

- (1) Nutrition;
- (2) Reproduction and regeneration. This latter is applied in the limited sense of the term, that is, limited to the re-

generation of nerve fiber of cell outside of the central nervous system. A cell inside of the central nervous system is incapable of regeneration.

The main property of nerve tissue is conductivity. This may be called its differential property. Next to this primary property we have as secondary properties irritability and excitability. Note particularly the difference between conductivity and irritability because this is the basis of an important distinction in connection with treatment. Treatment always appeals to irritability. The method of the application of the treatment may be to appeal to the excitability, but the ultimate appeal is to irritability.

#### THE PROPERTIES OF MUSCLE TISSUE.

The physical properties are the same as those of the nerve tissue, that is, consistency, cohesion, extensibility and elasticity.

The chemical properties are based on the fact that we find five distinct types of proteid substance in the muscle, namely:

- |                   |   |                             |
|-------------------|---|-----------------------------|
| (1) Myosinogen    | ) |                             |
| (2) Patamysinogen | ) | These are in order of their |
| (3) Myoglobulin   | ) | reaction to heat on the as- |
| (4) Paraglobulin  | ) | cending scale.              |
| (5) Albumose      | ) |                             |

(Note: The last mentioned represents the ferment in the muscle. Highest reaction to temperature? Pasteur's definition: A substance which will produce a change without being itself changed. See Haliburton & Kirke's Physiology.)

The main difference between these proteids is that they react by coagulating at different degrees of temperature, in the order in which they have been given. By this we mean that there are five grades of temperature reaction in the muscle substance and five grades of coagulability. In addition to these substances NaCl and Iron Salts and Potassium Salts form the salt basis on which the isotonic condition of a muscle is preserved.

The physiological properties of muscle are the same as in the nerve tissue, excepting number three, we have contractility instead of conductivity. We have therefore,

- (Mobility
- (Irritability
- (Contractility
- (Excitability

The Vital properties of muscle tissue are the same as in nerve tissue, namely,

- (Nutrition
- (Reproduction
- (Regeneration

Note in connection with regeneration that it is impossible in the muscle tissue, excepting on a connective tissue basis, that is, nutritive regeneration does not take place in muscle, but the regeneration sufficient to establish continuity of tissue.

These properties of nerve and muscle tissue may be said to produce all the phenomena of life, representing the activities of life, life energy. These properties exist as long as the body lives. When any one of them ceases to exist we have the beginning of death, for example, in lockjaw there is primarily a loss of extensibility and elasticity; if this is continued it cuts off nutrition and death results from the loss of these vital property of nutrition.

This is important from the osteopathic standpoint, because the normal condition of a tissue is not only the adjustment of its position in relation to other tissues but also the adjustment of its activities. This represents a very important part on the adjustment. How this takes place we do not know, but somehow molecular relations plus vitality establish the correlations among the activities.

In the early history of osteopathy the osteopathic system was limited to chronic conditions in which the structural part is the important part. In the acute diseases the reverse is true, the activity being the important part. The activity being at fault in connection with acute conditions of disease, the loss of contraction and extensibility, for example, causes the muscle to become rigid, as in tetanus. If this condition continues the patient cannot live, not because the life energy is diminished, for it cannot be either increased or decreased, but the activities of the life energy are repressed in such a way as to prevent normal life manifestations. Life really consists only of such manifestations. We probably know that there is a spiritual life that cannot be subjected to our examination, but all that we know of life is its manifestation, just as in the field of chemistry, all that we know about substance is its reactions. For the continuance of life these properties require to be kept in a state of perpetual activity, the suspension of the activity inco-ordinates the function.

To summarize the properties of nerve and muscle; as these properties lie at the foundation of the activities of life:

| <u>NERVE</u>                           |                                  | <u>MUSCLE</u>                    |
|--|----------------------------------|----------------------------------|
|  | <u>Physical properties</u>       |                                  |
| Consistency                            |                                  | Consistency                      |
| Cohesion                               |                                  | Cohesion                         |
| Extensibility                          |                                  | Extensibility                    |
| Elasticity                             |                                  | Elasticity                       |
|  | <u>Chemical properties</u>       |                                  |
| Nuclein (Phosphorized proteid)         |                                  | Myosinogen                       |
| Protogen (Glycerated proteid)          |                                  | Paramyosinogen                   |
|  |                                  | Myoglobulin                      |
|  |                                  | Paraglobulin                     |
|  |                                  | Albumose (ferment proteid)       |
|  | <u>Physiological properties.</u> |                                  |
| Mobility                               |                                  | Mobility                         |
| Irritability                           |                                  | Irritability                     |
| Conductivity (active with passive con- |                                  | Contractility (active with pass- |
| Excitability                           | tractility)                      | Excitability (ive conductivity)  |
|  | <u>Vital properties.</u>         |                                  |
| Nutrition                              |                                  | Nutrition                        |
| Reproduction, or Regeneration.         |                                  | Reproduction, or Regeneration.   |

The balance in the activity, or the balance of the activities, is kept up by the nervous system and the blood, the blood here including the lymph. From the osteopathic standpoint, then, these are the means of balancing the human activities, the materials needed to stimulate being, food, water and oxygen.

The nervous system, therefore, may be called in one sense the balance wheel of the body, with the cell function par excellence, because it operates the entire machinery of the body. This places the ultimate operative surgery of the body in the cell function, as distinguished from the fiber structure. This balance wheel, however, is balanced within itself as well as in relation to the rest of the body. This balance wheel is maintained as the two nervous systems play, (1) in opposition to one another; (2) in harmony with one another, both from functional and structural standpoints.

The first nervous system to be developed is the Sympathetic, representing the visceral activity, that is, the rhythmic activity of the organs of the body.

The other, the cerebro-spinal system, is developed later, representing the power of control, that is, the organizing force of the organism. This nervous system is the ultimate climax in nerve development. From the nervous side (structure) the brain represents the sum as well as the climax of all nerve tissue development. We must not forget that the brain, while it is the ultimate climax of nerve development is also one of the viscera and consequently is subject to control from the rhythmic standpoint through the sympathetic nervous system, hence the control exercised by the brain is limited by the reaction of the sympathetic nervous system upon the brain, that is, here we have a cycle again. This is the secret of the solution of a great many nervous troubles by osteopathic treatment, which the other doctors cannot cure because they do not seem to realize this intercommunication and interdependence of the two nervous systems, for example, viscous action is found in headache, the sympathetic nervous system<sup>2</sup> acting viscerally on the brain. Headache of this kind cannot be cured by any depressant that goes to the nervous system because the source is in the sympathetic system, or the field governed by the sympathetic system, and the only way to cure such a condition is to get directly at the nervous system. For example, this type of headache is best relieved by treatment in the lower dorsal area than in the upper cervical region; in fact, the lower dorsal is likely to be the field of lesions.

These two nervous systems develop separately; later they are united as co-operating parts of the great system. Most of the work of the osteopathic system has been built on the sympathetic system because the sympathetic system represents visceral action and visceral action is found principally in connection with inflammation, congestion and similar processes. The central nervous system has the control and in this sense the control resides in the brain, or at least operates through the brain or spine. This control manifests itself in the different parts of the body (a) by trophicity. The trophic condition is kept up by the cerebrospinal fluid secreted in the brain and passing out along the spinal cord and the different nerve paths to all the tissues and organs of the body.

(b) The other side of the cerebro-spinal control is represented by the nerve force generated in the neuron cells and distributed along the neuron branches to the different parts of the organism as nerve impulses. The co-operation of the nerve force and the cerebro-spinal fluid represents the nutritive and trophic conditions that we find in connection with the normal state of the body.

This gives to the nervous system with its cell functionings the power of controlling all the vital properties of all the tissues from the sides of nutrition and the regenerative and reproductive processes that take place within the tissues. These are the three sides of the physical characteristics of the organism. These are the three ways in which the cerebro-spinal system shows its control over the different parts of the organism. The media through which this control is exerted being nerve force and nerve fluid. In addition to this the sympathetic system controls the viscera, the resultant of this control of the sympathetic system showing itself in two main forms of activity:

(1) In rhythm, that is, the activities associated with such organs as the heart, the spleen, the liver, the kidneys and the brain. These rhythmic activities have to take place through the movements of organs and these organ movements lie at the foundation of tonicity, which represents the physiological properties of the tissues. This means that the physiological properties of the organs and tissues controlled by the sympathetic nervous system.

(2) In peristaltic action, associated with the different parts of the alimentary tract, with the blood vessel system and the brain, spinal canal and probably the spleen. The control of this side, that is, the peristaltic, is a condition of the cerebro-spinal and sympathetic systems. The trophic state represents a perfect nutritive condition on the basis of (a) Alimentation and (b) assimilation. Alimentation is a better word than digestion because it is broader, including mastication, salivation, deglutition and digestion. On the assimilative side we have the union of the digested food elements, after they have been metabolized, with the cerebro-spinal fluid on the selective basis, leading up to the assimilation of the food to the tissues. (c) This prepares for another process, in which the blood forming glands, for example, the liver, the spleen, the red marrow of the bone, the thyroid, the suprarenals, the lymphatic glands and the thymus gland, in the embryo, are making blood for each separate part of the body, as well as purifying the blood from its wastes.

The lymphocytes form leucocytes in the blood, representing the white and red blood function which is preserved in adult life. The spleen in early life is a blood forming gland, making blood corpuscles; in later life it is a blood disintegrating gland, preparing materials for reconstruction in the liver. The spleen is the heart of the portal circulation, the graveyard of the red corpuscles, and the reservoir for the excess of portal circulation, that is, it is the abdominal heart.

(d) The trophic state also includes the normal state of tissue activity, consisting of partial contraction and partial relaxation, both existing simultaneously. If the state of contraction



is exaggerated the muscle will be in a state of contracture, a variation from the normal muscle activity.

The sympathetic system exerts its control over the nerve tissues in general, including the central nervous system, by what is called the visceromotor system, except in the substance of the brain. The visceromotor system is a regulator and balance wheel. This visceromotor system consists of two sets of fibers:

- (a) Gray fibers that have the constrictor function. Gray fibers are all sympathetic fibers, that is, originate from the sympathetic system.
- (b) White fibers that have the dilator function. White fibers are all cerebro-spinal fibers originally and are of two types: (a) a type that goes through the sympathetic system but does not terminate, and (b) a type that does not go through the sympathetic system at all.

These two sets of fibers supply the blood vessel walls, forming the meshwork of plexiform fibers in the muscle of the blood vessel walls. These are found especially in the small arteries. The dilator fibers are cerebrospinal (called white because they have the White Substance of Schwann) and yet some of them pass through the sympathetic system without terminating in that system. The constrictor fibers are sympathetic (called gray because they have no White Substance of Schwann), originating in the sympathetic ganglia. Visceromotor control or regulation therefore, consists in the balance between the constrictor and the dilator function, this balance (a) originating in the sympathetic ganglia and the spinal cord cells, (b) being distributed through the plexuses of fibers in the muscle wall of the blood vessels.

The tonic state of the tissues depend on this balance of constriction and dilation and it is one of partial contraction, that is, the contraction stage of the tissue cycle predominates; the atonic state, therefore, may be represented by two conditions:

- (a) An over-tonic state, in which contraction very strongly predominates, the muscle becoming tense and hard.
- (b) The under-tonic state, the condition of the muscle being flabby and soft because the relaxation phase of the cycle predominates.

The trophic state of the tissues represents a perfect nutritive condition both from the blood and nerve sides (a) The nerve side representing the nerve force and the nerve fluid. (b) The blood side is represented by the blood quality, that is, the amount of nutritive materials found in the Blood, therefore it depends (1) on digestion and metabolism, (2) on the work done by the blood elaborating glands. Variations from the trophic state are two-fold (a) the atrophic, in which we find the absence of selective nutrition, the muscle wasting away because the nutrition is not kept up from the nerve side, therefore, the nerve side is the selective side; for example, the paralyzed muscle, when it wastes away, represents an incurable condition of the muscles; (b) the non-trophic state. Here we have a condition in which there is a change in the selective nutrition represented by over-nutrition or under-nutrition. This non-

trophic state does not imply the destruction of selective nutrition but simply its modification. Hence it is a curable condition.

Selective nutrition takes us back to the selective process in connection with the nervous system; that is, the nervous system presides over all the nutritive processes. In doing this we find (a) the nervous system elaborating both materials and force within itself; (b) the nervous system regulates and determines the extent of the preparation of materials in the blood field. Blood is prepared by the blood elaborating glands for each separate organ and tissue. The tissues and organs as well as the blood being under the control of the nervous system.

Nerve force and nerve fluid unite in picking the selective process in picking out that from the blood and applying it to the particular tissues. It is not a localized condition, but becomes dependent on the nervous system, the nerve force and the nerve fluid carrying on the process, hence we have to deal with the nervous system.

The normal is the trophic. The variations are (a) the atrophic and (b) non-atrophic conditions. These represent the state of malnutrition. This is the sense in which malnutrition may be said to be the primary cause of all diseases, e. g., from the osteopathic standpoint every infectious and contagious disease originates in a predisposing condition of the tissues, namely, malnutrition. This means that if the body is in a normal state of nutritive trophicity, the body is immune to disease, and that is the only immunity there is. This means that vaccination does not render the body immune, but it is the state of the organism that produces a protective condition of the body. Malnutrition, therefore represents changes that take place in the body:

(1) From the trophic standpoint. In this case the change is associated with the nerve force and the cerebro-spinal or nerve fluid, or both. This is sometimes spoken of as a state of neurosis. If the blood supply or the food supply is involved it is secondary to the neurosis. The neurosis proper represents a practical loss of function from the nerve activity, that is, nerve energy plus nerve fluid side. This is the starting point of all the infectious diseases, for example, if the mucous membrane of the throat is in a neurotic state there will be liability to an attack of diphtheria. The susceptibility to pneumonia is found in the fact that certain atmospheric conditions affect the pneumogastric nerve field in such a way as to produce a neurosis of the lungs. The disease can be overcome by overcoming the neurosis.

(2) From the tonic standpoint. This is what takes place in connection with the double nerve supply of the organs and tissues, the cerebro-spinal and sympathetic. From the standpoint of the sympathetic, that is, the visceromotor or vaso-motor system, partial loss of the tone makes the tissues or organs static; that is, it interferes with the vaso-motor activity of tissues. It also tends to make the blood static. This condition, the modification of tonicity lying at the foundation of malnutrition, represents an interference with the vaso-motor system, that is, malnutrition of the maltonic represents vaso-motor neurosis.

In the treatment of these conditions there are three ways in which osteopathically we may treat the conditions:

(1) By the correction of the adjustment in the structure, in order to correlate the activities of the structure, structural lesions interfering with activity, operation and co-operation, that is, the structure is the expression of the activity.

(2) By the stimulation of the weaker or the weakened activity. What I mean by weaker or weakened is, that the weaker is a comparative degree of activity in relation to antagonistic or harmonious activities. It is weakened when an activity is weakened by itself or some obstruction without any relation or reference to the rest of the activities, for example, the heart weakened without affecting any other organ, in which case the stimulation may be supplied through the nerve force, the blood supply, or both, the general rule being, if the nerve is immediately affected then the nerve ought to be the medium through which stimulation is supplied. If it is a reflex condition the stimulation should be applied through the blood.

(3) By the inhibition of some activity when another activity is weaker or weakened. In this case we inhibit the stronger in order to balance the weaker and the stronger. This is also applied through the nerve or blood supply, or both. In this case we deal mainly with the distribution of the life energy.

In No. 2 the life energy is freed from some obstruction or a pressure condition. This implies life energy and life force and it means that the method of treatment is based on the principle of the correct distribution of the life energy.

Life energy consists of (a) the forces of the body, physical, physiological and vital; (b) the fluids of the body.

The manipulative method is applied for the correction, stimulation and inhibition because it becomes nearest to the normal physiological method. Manipulation corrects the structure on a mechanical basis. The importance of this is not always appreciated by the osteopath. For example, in examining the spine we find that it is not according to our mental idea of a perfect spine.

In treatment we do not try to bring the spine up to the ideal of what it should be, but adjust each part in relation to the rest of the body as the body is. Rough treatment, therefore, is forbidden, articulation being the only method that is necessary. Manipulation increases the local and general life forces, not in quantity or quality but in activity. Nature converts the mechanical and physical into a physiological equivalent, so that physiological life is affected. Any change that we find in the structure of the organism as a whole, or of its parts, interferes with or changes the functions or relations of the organism and its parts and this in turn interferes with the life activities by interfering with some condition of the blood or nerve supply, or both; for example, pressure or irritation manifest themselves by certain objective signs. Therefore, we find certain objective signs which represent the inability of nature to co-ordinate and correlate these forces when some change exists in the structure of the organism or parts:

(1) Sensitiveness. Here we have the physiological equivalent of physical tenderness. Physiological sensitiveness, therefore,

is associated with the sensory nerve supply and may be found anywhere on the surface of the body, internal or external, where there are sensory nerves, for example, a capsule around an organ, a mucous membrane lining an organ represents a surface, such as the pleura, the peritoneum, etc.

(2) Tenderness. Is the physical expression of physiological sensitiveness. This represents a condition physiologically localized at some point but it becomes apparent only when it is subjected to some physical condition, such as physical pressure. Sensitiveness, therefore, is present whether it is touched or not, tenderness is present only when the part is subjected to pressure, that is, physical pressure brings out physiological tenderness.

There are different types of tenderness, for example:

(a) a tenderness along the tips of the spinous processes, indicating an anterior lesion of the spinal vertebra; (b) tenderness above the tips of the spinous and transverse processes indicating a lateral condition of the vertebra; (c) tenderness at the angle of the rib indicating the rotation of the rib on the long axis, either rotation up or down and also an anterior or posterior movement of the rib on its head as the center of movement; (d) tenderness of the muscles along the spine indicating one of two conditions:

- (a) a deep seated muscle contracture, or
- (b) a reflex tenderness originating in some organ.

Tenderness, therefore, in all its forms, is the physical expression of a localized physiological sensitiveness, the tenderness being brought out by pressure.

Sensitiveness represents a physical tenderness; tenderness represents a physiological sensitiveness; pain equals a subjective expression of physiological sensitiveness.

(3) Pain. Pain is the subjective expression of physiological sensitiveness and represents subjectively an objective tenderness. It is produced in one of two ways:

- (a) by overstimulation (nervous); or,
- (b) by lack of nutrition (blood).

Pain represents from the physical side warning on the part of the organism of an under or over physiological state. It is an index of something going on in the body that should not be going on. Pain, therefore, is a symptom, and a conscious symptom of a subconscious process, because it is subjective. Tenderness is subconscious because it also is subjective, for example, the pain of anemia represents an ache over the entire body caused by a lack of pure blood. Pain is defined as the prayer of a nerve for pure blood. General pain is also found in the form of aches over the whole body during or after a febrile attack. In this case the pain is physiological, the tissues being deficient in some nutritive elements, the reason for the deficiency being that the febrile state has eliminated some of the nutritive elements from the system by over oxidation, that is, superfluous oxidation.

- (a) Over-stimulation represents an irritative process causing the excitation of the nerve or the over-concentration of the blood. Hence, the pain of over-stimulation applies primarily to the nervous system

and secondarily to the blood.

- (b) Lack of nutrition reverses the order, the pain applying primarily to the blood and secondarily to the nervous system.

Over-stimulation may represent one of two conditions:

- (1) the over-concentration of impulses; or
- (2) the non-performance of the functional activities (locally) at some point, resulting in over-performance at some other point, that is, an equality of distribution.

Pain, then, is not a disease, nor is it a lesion, but it is a manifestation of a disturbance in the distribution of impulses or of the blood. Hence, pain is not a pathological, but a physiological, sign of a pathological condition. This means that pain is an unbalance of two things:

- (a) The nerve impulses;
- (b) The fluids of the body. Before treating to relieve

or alleviate pain, first find out the actual condition. If the pain is caused by the fluid side, that is, represents lack of nutrition or lack of distribution of blood, then it will be best relieved by an effort to stir up the fluid circulation by somewhat general treatment. This is the reason why we can relieve a headache by treating all over the body, that is, stirring up the circulation through the visceral organs, relieving the headache by taking the fluids away from the head. If the pain is caused from the nervous side relieve the mer cas pain by treating the spinal system.

There are two methods by which the spinal cord system may be treated:

- (a) By Inhibition, where the nerve influences are in a state of excitability, that is there is hyper-irritability of the nervous system.
- (b) By general articulation of the spine to correct the distribution of the impulses all over the nervous system. Here the cause of the pain is some condition in the spinal field, for example, irritation.
- (4) Irritation is another condition. This represents the result of the overstimulation of the motor system. Compare this with pain. One of the types of pain is overstimulation of the sensory nervous system.

This means that irritation disturbs (a) the purely motor system, or, (b) the vaso-motor system, or (c) the reaction from (a) or (b) may produce a disturbance of the sensory equilibrium. Some think that irritation is purely sensory, which, however, is not true. Pain is primarily a disturbance of the sensory apparatus; irritation is primarily a disturbance of the motor system.

Pain is sometimes found in connection with the motor nerves because in the sheath of every nerve that has the White Substance of Schwann there is a special sensory pain apparatus called Nervi Nervorum Peripherisorum. Pain is associated therefore either with the motor or sensory nerve trunk because the <sup>pain</sup> nerve fibers are in the sheath. For example, in sciatica the pain is not in the sciatic nerve proper but in the sheath of the nerve. This is why the stretching of the

nerve is of value in relieving the pain, just like pressure over the nerve itself. Practically the only way we can reach the sheath is to stretch the nerve because it is in a congested condition. The next common type of irritation is the disturbance of a particular center. The tissues supplied from that center being in a state of irritation the irritation shows itself in the contraction of a muscle, increased peristaltic action, as in the intestine, or an increased rhythmic action, as in the kidneys and heart.

Tenderness and irritation represent objective conditions to be discovered by some physical means. Pain, on the other hand, is a subjective condition known only to the patient, unless we have some pain expressions, e. g., we can sometimes read pain in the face; sometimes in the general conditions of the body; these, however, are physical expressions of the subjective condition.

(5) Lesion. Result of an irritation, except in traumatism. Any irritation in a tissue or organ may produce a lesion. That is, irritation of a tissue may produce a lesion in an organ, or irritation in an organ may produce a lesion in the tissues. For example, a lesion in the 2nd and 3rd lumbar vertebrae area may be associated with a rectal condition, or vaginal or uterine condition, or a sigmoid condition.

The nerve tissue being the most irritable of all tissues is more particularly involved in the production of lesions. The result of modified irritability is the disturbance of the motor or vaso-motor phenomena associated with the tissue or organ, because the motor and vasomotor changes represent results or effects, the cause being found always on the sensory side. For example, if an organ is inactive it will mean the absolute cessation of those impulses that cause activity, pressure cutting off completely the nerve impulses, as in paralysis. If an organ is overactive pressure on a nerve over-stimulates, resulting in an increase of activity. Modified irritability of the nervous system often is the cause of a lesion in the spinal area. If an organ is underactive we may find two conditions:

- (a) Slight pressure cutting off some of the nerve impulses, for example, pareisis.
- (b) If there is a lessening of activity due to pressure and it is not sufficient to cut off the impulses, there must be excitability and this is expressed in spasms, convulsions, epilepsy, etc.

These conditions represent a condition of the nerve supply resulting in an interrupted activity of the tissue or organ. This gives us three different stages of modification in the activity:

- (1) inactivity, that is, complete loss of activity;
- (2) over-activity;
- (3) under-activity.

Physiological irritation may also result in pathological conditions of the tissue. For example, of tissue as in the thickening of the muscle. Enlarged formation of tissue by proliferation of tissue, as in nerve and connective tissue and ligament. The result of this pathological condition is an interference with the functional activities, either of tissues or organs, or of nerve or blood supply. The best examples are found in connection with the spinal column, as

in locomotor ataxia. (1) Primarily it is a thickening around the nerves at the foramen of entrance and exit of the posterior spinal nerves. (2) If this thickening persists there results a disease that we call locomotor ataxia, caused by the complete cutting off of the nerve impulses. Primarily it is sensory in origin, the posterior roots being involved, cutting off (sensorily) the co-ordination of movement, for example, co-ordination of muscle sense and vision. (3) Therefore, locomotor ataxia is due to the inco-ordination of the muscular sensation with the sensation of vision, the muscular sensation being primarily deficient because of the thickening of the structure at the foramina. Locomotor ataxia is curable if we can relieve and remove that thickening; incurable if we cannot; if we can restore to normal the modification in the nerve field.

Tenderness is brought out by pressure. Contact is simply touch, while pressure is deep touch. Contact would not bring out tenderness, but would bring out sensitiveness. Tenderness—physical plus the physiological.

Pain is produced in two ways: (a) by disturbance in the sensory nerves amounting to over-stimulation; (b) in the blood, by lack of nutrition.

Pain, therefore, is an objective expression of a subjective condition. We are conscious of pain but the pain itself is the objective expression of a subjective condition. Over-stimulation represents the one side of pain and lack of nutrition the other side. To correct over-stimulation we must correct the distribution of the nerve force. To correct the blood pain we must correct the distribution of the blood. Pain is physiological, although it may represent a pathological process. Pain is to be relieved, if it is a nerve pain, by inhibition; if a blood pain, by general treatment to equalize the circulation of the blood.

Irritation involves the motor system, while pain involves the sensory system. Sensitiveness, or sensitive tenderness are practically the same, that is, the same as pain. Irritation is a reflex from the sensory side.

In treating an irritable heart we get the best results by treating it from the sensory side. The same thing applies to any other organ. All the sensory nerves from the heart pass through the superior cervical ganglion, so that the best point to reach the heart is through the superior cervical ganglion on the left side by strong inhibition. Epilepsy, hysteria and general nervousness can be controlled also by inhibition over the superior cervical ganglion, particularly on the left side, unless where the stomach is involved in the irritability, when inhibition will be applied on the right side also.

In locating the superior cervical ganglion for such an inhibition, inhibit from the middle of the second cervical to the middle of the sixth cervical vertebrae. If the ganglion does not extend so far down we catch the fibers before they enter the ganglion. In treating the superior cervical ganglion lay the fingers right over the pulsating carotid, then slip the fingers backward until they are free from the carotid (or beyond) and then apply strong pressure from the anterior towards the transverse processes of the cervical vertebrae. The ganglion lies right back of the carotid. Free the carotid as

follows: after placing your fingers over the carotid push the neck over slightly, lateral to the side, and the elasticity of the carotid will make it slip forward while you allow your fingers to slip backward. The reason we require to keep away from the carotid is that it acts upon the pneumogastric and thus affects the heart quite opposite to the treatment given through the superior cervical ganglion. The vagus is inhibitory to the heart; the sympathetic is accelerator.

**Lesion.** The conditions involved, as expressed in the tissues, would be, inactivity, that is, paralysis from the motor side or over-action expressed by spasms of some kind, or under-action, the slowing down of function or inco-ordination of the sensory and motor sides, as in locomotor ataxia. In lesions we are dealing mainly with conditions of obstruction, but also with the modified activity. This is found either in connection with the blood or nerve supply, or both, because these are the field of distribution:

- (a) Commonly it originates from some misplacement of tissue, for example, bone, muscle, nerve, ligament, etc.
- (b) It may also originate from an overgrowth of tissue, the enlargement of the tissue substance obstructing the blood or nerve supply.
- (c) It may be caused by the excessive contraction of tissue. This applies principally to muscle or ligamentous contraction along the spine or around the joints.
- (d) Obstruction may be caused by a pathological condition of the fluids of the body, for example, coagulation of blood following the rupture of a blood vessel, or the presence of some foreign substance in the blood. In whatever form the obstruction appears it interferes with
  - (1) The nerve supply;
  - (2) The blood supply. In both cases by pressure.
  - (3) The nutritive state, causing a non-trophic or atrophic condition of the tissues.
  - (4) The tonic state, causing an atonic or non-atonic condition.
- (e) Resulting from these changes there are reaction changes in the blood and nerve supply and through these reaction changes there is an interference with the rhythmic activity of the tissue or organ that is involved. This applies to those organs that have rhythmic activity, such as the heart, the liver, the spleen, the brain, etc.
- (f) There may result an interference with peristaltic or arrhythmic action, such as we find in the alimentary canal, or in the brain. In the brain, therefore, there is generally a double interference, namely, with Rhythm and peristalsis. To understand this we must distinguish between peristalsis and rhythm in the brain:

Peristalsis in the brain. This depends on three varieties of movement, that is the peristalsis of the brain is the net resultant reaction of three types of movements:

- (a) One corresponding with the systole and diastole of the heart, starting from the Circle of Willis as its center and moving upward towards the roof of the brain, that is, the inner table of the



cranium. The function of the roof is to limit rhythmic action of the brain insofar as it corresponds with the systole and diastole of the heart.

(b) One corresponding with inspiration and expiration, starting at the great longitudinal sinus and moving downward toward the base of the brain. This base represents a lymphatic cushion in the fossae you find in the skull.

We generally build a structure on a solid foundation, no matter what the roof may be. In the brain it is the other way; the base of the brain is soft but it prevents the brain from becoming compressed from the roof.

(c) One corresponding with the vasomotor activities of the body, starting at the pia mater arterioles as they slip down into the brain substance and moving in the direction of the center of the brain substance. The outer surface of the brain substance covered over by the pia mater represents the starting point, that is, the third plane in the cycle of the vasomotor variation. These three represent the rhythmic movements of the brain.

The peristaltic movement is an undulatory or a worm like movement that passes over the entire surface of the cortex, originated from or by the three movements (rhythmic). Peristalsis does not go down below the cortical layer of the surface, but is limited to the field of the convolutions of the brain.

Rhythm goes down through all the brain and everything else contained on the inside of the brain. Remember that peristalsis results from rhythmic movements. The rhythmic type of movement is controlled by the splanchnic system.

That finishes up the discussion of the different terms of expressions I used in speaking of conditions that we find in the body, namely, sensitiveness, irritation, pain, tenderness, over-stimulation and obstruction.

Pressure is one of the physical conditions in pain, in tenderness, in irritation and also in obstruction. That is really not a condition that we require to take any special notice of, beyond noting the fact that it is a physical condition.

THE THEORY OF THE TREATMENT OF DISEASES.

I. General Discussion of the Conditions of Disease.

- (a) Differentiation between the condition of disease and the state of disease.

In order to be able to treat intelligently we require to make a diagnosis and put the different points in their proper place in relation to cause and effect. (1) We are always dealing with the vitality. We defined vitality as the sum of all the vital activities of the body. (2) We distinguish between nutritive health and vital health. Nutritive health includes three things; first, the supply of materials on the nutritive basis, that is to say, the proximate principles of the body supplied as food; second, the power of the body to receive those food materials, the receptive power, that is peculiar to the living body. For example, in the case of a dead body, we could inject the same materials but there would be no receptive power in the dead body, that is, the receptive and rejective power of the body. Hence inoculation or injection is wrong physiologically. Because the vitality is gone. Thirdly, the power to assimilate. When the body has received and digested and absorbed the materials, then it assimilates those materials to its own substance. These are the three things that are included in nutritive health.

In vital health, as distinguished from nutritive health, there are two other points. Fourth, the adjustment of all the different parts of the body on a structural basis, and fifth, the adjustment of all the functional activities of the body on the basis of vitality, or a vital force governing all other changes.

Vital unhealth, distinguished from vital health, means an impairment or a deficiency in any one or more of those five points. What is the relation between vital health and vital unhealth? Vital unhealth is produced by some disturbing element, the vital health being changed into the vital unhealth by means of or through that disturbing element. Now, that disturbing element is what we call in the osteopathic field, a lesion, using the word "lesion" in the wide sense of the term; hence, we may have a lesion in any of the five points that we have mentioned as included in vital health-- a lesion in the food supply, a lesion in the power to receive, in the power to assimilate, in the structure of the body or in the functions of the body, or functional activities of the body. We do not need to illustrate those. We have a state of vital unhealth, the abnormal side of vital health, starting out in the disturbance of the vital force or vitality.

What is disease? Disease is a condition or state of the body that we have associated with the body, the parts of the body, the organs of the body, as a result of this disturbance; disease is an effect, not a cause. It is an effect of what? It is an effect of the disturbance that we have mentioned in connection with vital health. Hence, we conclude (1) that conditions are what we have to deal with-- a state of the body in disease; (2) the state that we call disease is always a result of the previous condition of vital unhealth.

From this standpoint we have diseases that are enumerated in all of the works on the practice and it is convenient, probably, to discuss both diagnosis and treatment from the standpoint of disease, not because it is scientific but because it is convenient. Taking disease as a starting point and attempting to trace it backward, there are three topics that come out for discussion, practically on the same plane. First, there is what is called the etiology of disease, the cause or causes of disease. What is the etiology of disease? The etiology of disease represents the pathological change in the adjustment, as we said before, either from the vital standpoint or the physical standpoint, or the physiological standpoint. Etiology, therefore, represents the pathological, or the abnormal activity of the cell, the tissue, the organ or the body taken as a whole, taking it for granted that the vital force animates all of these and lies behind all of these.

This idea is somewhat different from the general idea that is conveyed by the term pathology. Pathology, as it is commonly used, is taken to cover simply the field of morbid anatomy, the morbid changes that take place in the tissues of the body in connection with or as a result probably of disease. But pathology begins before that. Pathology begins in the etiology stage when we have anything abnormal in the action or activity of the cells, the tissues, the organs or the body, that is, the field of disturbance is differentiated into the five fields. The abnormal activity is the starting point in the pathology. We can illustrate this probably in relation to febrile states. Fever, is not simply an increase of temperature. Fever requires three conditions before it can be designated as fever:

- (1) There is an abnormality, or a derangement in the activity of the heat apparatus;
- (2) a reaction from this abnormality in connection with some organ, organs or tissues of the body, resulting in their overactivity and in the production of an excessive amount of heat;
- (3) resultant nutritive changes, that is, the organs and body cannot nourish themselves as normally;
- (4) resultant tissue changes.

These tissue changes are the effect of the increased temperature and the reaction on the part of certain organs or tissues. That brings out the point of etiology. In primary etiology there is the disturbance, the abnormality, the pathological condition of the temperature apparatus, and all of the rest that follows represents successive changes that take place as results.

In the case of any disease or diseased condition we require to trace out the same etiology; we require to find what is abnormal (1) on the vital force side, (2) in the physical structure of the body and (3) in the physical and physiological functioning of the body. These are the three fields in which the etiology is brought out, and in the discussion of diseases from the osteopathic standpoint, the etiologist always lays emphasis on those three points.

II. Another subject that comes up for discussion in connection with diseases is the evidences of the diseased condition, or

of the pathological adjustment. What are the evidences of the pathological adjustment? Signs of the inability of nature to adjust itself to the existing abnormal conditions. This covers the field of what is called symptomatology, or symptomatological manifestations of the change in the adjustment of the cells, the tissues, the organs and the body as a whole, presuming, as we said before, that all of these are animated by the vital force, the vital force lying behind all these.

Symptomatology is either objective or subjective. (a) It is objective, that is, it applies to what some one else besides the patient himself can see or observe in the patient, his attitude, his environment and so on. An example of an objective symptom will be temperature. Of course, this, in part, is subjective, because the patient can feel when he becomes excessively hot, but there are some cases in which temperature may be present and still the patient may feel cold. Temperature is an objective symptom, and it is one that we must not overlook. (b) A subjective symptom is a symptom which the patient feels himself and about which the patient only can tell. For example, pain may be taken as a subjective symptom. It is true that sometimes pain becomes objective, when we see the distorted face and different attitudes of the body in the attempt to suppress or check pain, but pain as felt, the nature of pain, can only be told by the patient himself, and hence it is a subjective symptom.

Symptomatology has a field that requires to be emphasized in the osteopathic system. Some osteopaths of the present day say that they do not pay any attention to symptoms, they do not want to know anything about symptoms.

Symptomatology is undoubtedly all-important. What is a symptom? Is a symptom pathological or physiological? A symptom is physiological, in my opinion, and a symptom is an evidence of some disturbance in the adjustment of the vital economy. What does it express? It is the expression of the inability of nature to adjust itself to the abnormal, that is, the voice expressing, or demanding assistance to return to normal. A symptom is the voice of the vital force, expressing itself through the body. Now, what does that mean? That means that the body is in a pathological condition; there is a change in the adjustment. What does that imply? That implies that the vital force is being crowded or crushed down by this pathological adjustment. The vital force is attempting to overcome that pathological adjustment, and in attempting to overcome that pathological condition it cries out for help. Hence, pain has been defined by one of the physiologists as the prayer of a nerve for pure blood and it is true in that sense, because pain represents the cry of the cell, of the tissue, of the organs or the body as a whole for help in struggling against the pathological adjustment of the body. The same thing is true of all the other symptoms.

What is the moral of that in the field of treatment? That the regular practitioner, as he calls himself, makes a grand mistake when he uses an opiate, for example, to suppress pain, or a febrifuge to suppress temperature. In doing that he is attempting to silence the only voices that can express the real condition of the vitality; he is changing the condition of things within the organism to such an extent that it is impossible to get a real picture of the true condition of the patient. The sum total of the symptoms, objective and subjective,

covers the picture of the case, so that if we suppose of attempt to destroy any symptom, either subjective or objective, we are really making it impossible to diagnose the true condition and, from that standpoint, to attempt to cure the patient; hence the symptoms must be taken account of before we are able to diagnose the case.

(3) Another field in which diseases manifest themselves is in their effects, their products or their results. The effects or the results of disease are brought out in two fields: (a) in the field of morbid anatomy. This is the field that is commonly said to be covered by pathology- morbid changes in the cell, in the tissue or in the organ. (b) The second field in which disease manifests itself is in morbid physiology; that is to say, a change in function or in certain functions of the body, or of the mind. What does that mean? That a large class of chronic diseases would practically be classified here, because these chronic diseases are effects or products from the physiological side of some preceding state of mal-adjustment, in the wide sense in which we have used it. A chronic disease then, like constipation or diarrhoea, settles down as a permanent condition. And how does it differ from an acute disease? In an acute disease we have what are called the prodrome, the period of progress, the period of decline, the period of decline terminating in the recovery of the patient or in the death of the patient. In a chronic disease we have the prodrome, the period of progress and no period of decline, the period of progress going on continuously as long as the patient lives, unless the chronic ailment is cured.

This covers not only the field of body diseases but also the field of mental diseases. Effects may be found in connection with the mind, as a result of these previous conditions of mal-adjustment; for example, insanity, probably in all cases, is a product or a result of a previous state of body mal-adjustment. Insanity following certain acute diseases or chronic diseases will illustrate this point. Take, for example, the insanity of the puerperal state; that insanity follows directly upon or accompanies a puerperal fever, and it may last for a short time or it may persists all through life. Delirium in some of the fever states is also a state of insanity, temporary insanity, the mind being unbalanced on account of the crowding down of the diseased condition, upon the mental apparatus, with the result that there is a perversion of the mental functioning, and hence we have the delirious state.

That opens up the whole field of diagnosis, so that we have on the same plane etiology, the symptomatology, the morbid anatomy and the morbid physiology. These are the four points that require to be emphasized in connection with the conditions that we find in a state of disease. This makes the diseased condition (a) dependent upon a cause (b) manifested by symptoms, and (c) brought out objectively, by objective expression in the structure, in morbid changes, either in structure or (d) in its function, or both. The important point from the standpoint of the treatment of disease is the etiology.

The consideration of morbid physiology, morbid pathology and symptomatology is only of service to us insofar as these point us to the cause. All osteopathic treatment is founded upon this principle, that we must remove the cause, otherwise we cannot treat

the condition, we cannot cure the patient, or in fact do any good to the patient without finding out the cause. Hence we use all of these other fields as pathways up to the etiology, and in fact, we might say that all of these other fields may be sub-classified under etiology. Etiology expresses itself through symptomatology; it expresses itself through morbid anatomy, and it expresses itself through morbid physiology. We use all of these as instruments to lead us back towards the etiology. Hence in discussing the different diseased conditions etiology will be the all-important point.

The diagnosis, as well as the treatment of disease, is based upon the fact that there is a ~~definite~~ definite relation established between every cell, every organ and every tissue, on the one hand, and the central nervous system on the other hand; that is, the central nervous system is the great organ in connection with which the vital force expresses itself, because that vital force is the prime factor both in health and in unhealth or disease.

How is this definite relation sustained, and how is it carried out? The nervous system is differentiated and based on the segmentation of the body. It is sustained and carried out (1) by means of the segmental arrangement of the body and (2) the segmental arrangement of the spine. The segment arrangement of the body gives us, Segment One, the head; Segment two, the neck and the thorax; Segment three, the abdomen and pelvis, and segment four, standing by itself, the extremities, the upper and the lower extremities.

Everything as we said before, must have its foundation in the embryological field, and here we get the foundation for this segmental arrangement. In the field of embryology the head is a segment by itself, and the gland which presides over embryological development of the head, including the cranium and the brain, is the pineal gland, or the pituitary body. In the neck and thorax we have two sets of glands, the thymus gland, which is sometimes called the mother of the white blood corpuscles, because the white blood corpuscles originate first in the thymus gland, and the thyroid glands, which are the blood forming glands for the upper part of the body. In the lower part of the body trunk we have the suprarenal, or adrenal, bodies, the medullary part of these bodies being originally sympathetic nerve tissue, and in that way being closely related, nutritively, to the sympathetic nervous system. In connection with that there is an outgrowth and development from the sympathetic system. The regenerative function is associated with the thoracic region; that is, the cerebro-spinal ~~field~~ field of nerve energy in segmentation. We have what are called the sexual glands, both in the male and the female, these being developed for the purpose of the reproductive function, preservative both of the body as a body and preservative of the body as a part of a species or of a race.

All of these glands that we have mentioned as presiding over these different segments of the body have their nutritive function. in the regenerative and reproductive sides of nutrition. The body was originally one segment—the neck and the thorax, that is, the central nervous system. The prolongation downward gives us the abdomen and pelvis and here we have the sympathetic system centers. The other two segments are formed by budding. In the development of

the original single segment of the neck and thorax: the cerebro-spinal system presides. In the development of the abdomen and pelvis the sympathetic system presides. This centers in the solar plexus. Hence, all conditions in this field are predominantly sympathetic.

The pineal gland has a special function in relation to the bones, as well as the nervous system, via the brain. The thyroid glands have a special relation to the central nervous system and to the dilator function of the central nervous system in connection via the arterial blood vessels. The adrenal bodies have a special relation to the sympathetic nervous system, first in origin and second in function; that is, in functional activity, especially manifesting their control over the constrictor function of the arterial blood vessels via the constrictor center in the medulla, distributed through the central region of the spinal cord, 2nd dorsal to 2nd lumbar, and the sympathetic ganglia. The reproductive glands have a special relation to the nervous system and a nutritive relation to the brain substance, as well as from the standpoint of their external secretion, being the reproducing glands for perpetuating the human race. This is illustrated, as we will see later, in the function of detoxicity, freeing the body from toxic substances.

That illustrates the segmental arrangement of the body and the fact that there is located in each one of these regions or segments a particular organ or set of organs that are concerned in the nutritive and protective processes. From the osteopathic standpoint, therefore, in the treatment of diseases, we find it of great importance to look after those particular glands. The pineal gland, for example, in connection with such conditions as hydrocephalus, acromegaly and rickets where we have imperfection in the structure or impairment of the structure of the bones; that gland is reached primarily by the treatment in connection with what we mentioned before as the peristaltic movements of the brain substance, and the parallel flow of blood and lymph, or cerebro-spinal fluid, as the lymph is called in relation to the brain.

The thyroid glands are of great importance in connection with imperfect development or impairment in the functional activity of the central nervous system, for example, in exsipient insanity, cretinism in a lesser degree, in hysterical manifestations and nervous diseases of that type, it is necessary to look after these thyroid bodies, as well as in cases of goiter and in cases of abnormality in the menstrual function. In abnormality of the menstrual function we very often have disturbances of the thyroid gland. I am watching a case at the present time of a girl about fourteen years of age, who is developing not what we would call goiter, but simply a thyroid disturbance, at the time when the menses are being established, and these menses are being established on a painful and on what we would call a difficult or labored basis; so that in all these disturbances involving the menstrual function we require to look after the thyroid glands. These thyroid glands are very vascular bodies, and they are also supplied very abundantly with nerves. Both the blood and the nerve supply are controlled from the middle cervical region, that is to say, the fourth, fifth and sixth cervical verte-

brae region, and it is of importance to note the fact that the only nerve supply that these thyroid bodies have in connection with their blood vessels is a dilator nerve supply.

That explains practically the etiology of goiter. The fundamental basis of the nutritive and protective conditions of the body is in what we might call arterial sway, that is to say, it is the swaying vibratory peristalsis of the vessel walls throughout the entire system.

In the thyroid glands, when on account of some maladjustment somewhere, for example, in the menstrual apparatus or in connection with the nervous system, the blood flow to those thyroid glands is interfered with, those thyroid glands have not the resisting power because they have not constrictor control, they simply dilate and dilate until they are overfilled with material, and they cannot empty themselves of that material. Hence, we find the enlarged glands that are present in goiter. That practically brings out the philosophy or the theory of treatment from this standpoint in relation to goiter. What is it? The theory of treatment is to free and to keep free and unobstructed the venous drainage from these thyroid glands, at the same time stimulating, stimulating the nerve supply into the glands, so that when you have a free venous drainage away from the gland and force the gland rhythmically to act, then the substance which has collected within the gland may be drained away in the venous channels, and that is all that is done by way of treatment in connection with this goiter condition. Raising the clavicle, correcting cervical lesions, for example, is one of the important means that is made use of in order to stimulate the venous circulation flowing down from those thyroid bodies.

Thyroid conditions are closely related to heart conditions, and they are also closely related to eye conditions, as we know in exophthalmic goiter, where we have these three factors involved, - eye, heart and thyroid glands. A good deal of discussion has taken place as to where the starting point of the disturbance is. The majority of writers claim that it is either in the eye or in the heart, I think the most of them claim it is in the heart. I think, as a matter of fact, the starting point is nearly always, it not always, in the thyroid glands. The thyroid glands lie almost midway between the eye and the heart, and in very close relation to the blood supply of both. The thyroid glands lie just opposite the middle cervical ganglion. What is the function of the middle cervical ganglion of the sympathetics, in relation to the heart. The function of the middle cervical ganglion in relation to the heart is accelerator, so that the moment you have an interference with the thyroid gland, reflexly, that interferes with the heart through the middle cervical ganglion, and if that interference is kept ~~the~~ up then, of course, the heart is kept in a continued state of agitation.

How do we trace out the connection with the eye? The cilio-spinal center is located at the second and third dorsal. What does that mean? That the second and third dorsal is the point from which the nutrition of the eye is controlled. How does it reach the eye? The nerve supply passes out from the spine and into the sympathetic chain, including the middle cervical ganglion, to the carotid and



cavernous plexuses of the sympathetics and outward to the eyes. You will notice that it passes through the middle cervical ganglion, which is the ganglion that controls or has the most to do with the control of the thyroid bodies so that there we have in that middle cervical ganglion of the sympathetic system a point that will explain the relation of the eye, heart and thyroids to each other in exophthalmic goiter, and we will find the same points later on when we come to speak of eye diseases. The lesions correspond with this.

The diseases that are commonly diagnoses as optic atrophy and are given up by all sorts of physicians as incurable cases, are cured by us by applying inhibitive pressure and correcting lesions at the third and fourth cervical, the second and third dorsal. We correct those lesions and remove what is diagnoses as optic atrophy. It is simply the obstruction to the eye, and whenever we correct that condition the eye gets its normal nutrition and comes along all right. I saw a man who was treated by one of our professors at the college for optic atrophy. He had been treated for some time by electricity, by the use of first chemical and then static electricity. The chemical and static electricity were both applied right in the interscapular area of the spine, and one interesting point that was brought out there by the use of the electricity was that the man was practically stone blind, but where there was applied one pole or one electrode in the upper dorsal, and the other electrode at some indifferent point, the man could see a light in his own eye, indicating that that was going right to the point. In addition to that, when we took the man at that point and applied inhibitory pressure, he could feel that impulse passing up along his neck and going out to his eye, indicating that we have there a direct nerve connection, just as we have traced it out to the eye from that point in the spine. The same thing is true of the third and fourth cervical region, so that here we have an objective point to unite the head segment with the neck and the thoracic segment of the body.

The supra-renal bodies, as we said, preside over the abdominal segmental functioning, from the nutritive and protective standpoint, and especially furnish the foundation for the constrictor stimulation to the entire arterial blood supply throughout the system. How do we get at those supra-renal bodies? Those supra-renal bodies are related to the spine through the last two dorsal and the first two lumbar vertebrae, giving us the connection both through the supra-renal and the renal plexuses, as well as direct connection through the sympathetics, and this can be stimulated to secure constrictor effect; in fact, that is the region, the eleventh and twelfth dorsal and the first and second lumbar, where we get the strongest effect on the sympathetic system throughout the whole body. That is the field of the most irritative lesions affecting the visceral system.

Of the reproductive glands we cannot say much because we know little about them, and we will discuss that subject later on in connection with the wider field of segmental disturbances.

There is one point I did not mention when I was speaking of the eye. We sometimes use, or see used the different substances to dilate the eye, to produce dilation of the pupil. We can dilate the

eye by strong inhibitory pressure at the second, third and fourth dorsal, and you can produce that dilation to such an extent that it will last for three or four hours, by the inhibitory pressure at that area of the dorsal region. That is of importance in some inflammatory eye diseases, where you require to dilate the eye, like iritis. In iritis that is one of our treatments, strong inhibition every three hours at the second, third and fourth dorsal, because it produces dilation, and it will keep up the dilation for three or four hours.

The foundation of the segmental arrangement of the body, then, presents some important points of great value in the discussion of diseases. If this point were worked out we could classify diseases on the basis of such a segmental division.

The segmental arrangements depends upon the differentiation between the cerebro-spinal and the sympathetic nervous systems. These are two or three points that we require to pay attention to. The first is, that there is a co-ordination between the two systems, the cerebro-spinal and the sympathetic; both are independent in origin, development and function; second, that co-ordination includes harmony between the two systems and inter-dependence of the two systems on each other. Three. This union between the two nervous systems is secured by the segmental arrangement of the spine, including both spinal cord and column, through those white rami communicantes from the first dorsal to the second lumbar, inclusive. That is the area from which those white rami pass. That is the area of what is called tonic constriction; that is, tonic impulses originating from the spine at that point, pass out along the white fibers to and through the sympathetic ganglia to every part of the nervous system. For example, first of all white rami to the superior cervical ganglia for the purpose of controlling the face, the eyes, the ears, the nose, the brain and the head in general; secondly, white rami to the inferior and the middle cervical ganglia, for the purpose of controlling the throat, the tonsils, the neck in general, the thyroid bodies and the lower part of the neck above the clavicles on either side. Thirdly, white rami to the upper dorsal ganglia of the sympathetics and thence passing out to the heart and the lungs, and the thorax in general. Fourth, There is a special area at the fourth and the fifth dorsal, where we have white rami to and from the center for cardiac rhythm, and the center for pulmonary rhythm and the center for the superficial circulation; all of these located at the same point in connection with the spine and passing out to the particular fields supplied. Fifth, white rami that pass through the dorsal and the lumbar ganglia of the sympathetics to the organs that we find in the abdominal cavity and in the pelvis. Sixth, the sacral region sends out what are called homologues of the white rami, these white fibers passing directly to the prevertebral plexuses, and through these plexuses to the pelvic viscera, these fibers acting as splanchnic branches of the sacral nerves. For example, these fibers supplying the rectum, the bladder, the vagina, the ureter and the urethra, so that we have a direct communication from the white fibers of the sacral region to these organs without sympathetic interference. This is the region, therefore,

where we can apply mechanically direct stimulation and direct inhibition, the stimulation and the inhibition going directly to the organs without passing through the sympathetic ganglia.

The only region in the spine where we have no white rami is the cervical region, so that the cervical region of the spine stands out distinctly by itself, without those white rami connections between the spine and the sympathetic ganglia. This is supplied by the visceromotor ramifications of the cranial nerves corresponding with the white rami in this region.

Another method by which the sympathetic system is united to the cerebro-spinal system is by means of what are called the gray rami communicantes. These gray rami communicantes pass out as neuraxons of the cells that are found in the lateral ganglia to all of the spinal nerves, uniting with the anterior primary divisions of the spinal nerves, to be distributed to the muscles, the skin and the superficial tissues, along with the anterior or the posterior primary divisions of the spinal nerves, in connection with motion and sensation; and also with the recurrent fibers and the posterior branches of the spinal nerves, to be distributed to the meninges of the cord and to the spinal cord structure proper.

These fibers represent, from this standpoint, the vasoconstrictor fibers to the skin, to the skeletal muscles, to the sweat glands, to the sebaceous glands, to the heart and also the vasoconstrictors to the spinal cord substance, and to the meninges of the spinal cord. All the superficial tissues that we find along the spine receive an anastomosing nerve supply, with the nerve supply that goes to the spinal cord and the meninges of the spinal cord; hence the reason why we have a means through the superficial tissues of reaching the cord and its coverings.

The cerebro-spinal nervous system, as a system, is said to have four distinct functions; first, the function of motion. This function of motion is based upon the primary characteristic of mobility, which belongs to the nervous tissue, and the result of this function in the tissues to which the nerves are distributed is activity.

The second function is sensation. This function is based upon the vital property of irritability that is associated with the nerve tissue, and this irritability is aroused into activity by some form of stimulation, the stimulation taking place in connection with the sensory terminators.

The third function is that of nutrition. This refers to the food supply which is furnished in connection with the blood; that is, distribution function. The function of circulation distinguished from distribution is a function of the sympathetic system. That is, distribution is cerebro-spinal.

The fourth function is that of trophicity, and this is concerned in the assimilation of the food materials when they have been metabolized to the different tissues of the body. The two media through which this assimilation takes place is (a) the lymph from the side of circulation, that is sympathetic, and (b) the cerebro-spinal fluid from the side of distribution, that is the cerebro-spinal nervous system.

These two latter functions, nutrition in its distribution, and trophicity, are based upon the vital property of the nerve tissue which is called conductivity, so that the cerebro-spinal nervous system, in the discharge of its functions, brings out into prominence the four vital properties, mobility in relation to motion, irritability in relation to sensation, conductivity in relation to nutrition and distribution and trophicity in relation to assimilation.

The sympathetic system, on the other hand, has as its greatest function the function of visceromotion. This is the original and inherent function of the sympathetic system. The second function is that of vasomotion. This vasomotion is especially concerned in the constrictor- the tonic function. This tonic function primarily originates and centers in the medulla, the great center for vasoconstriction being on the floor of the fourth ventricle, close to the calamus scriptorius, on either side of the median line. This tonic center sends down impulses to the spine which are distributed through the middle region of the spine, from the second dorsal to the second lumbar; that region (second dorsal to second lumbar) therefore, acts as the distributing of these tonic impulses through the sympathetic system to all parts of the body, including, as we said before, the spinal cord and the covering of the spinal cord, so that the spinal cord, its coverings and the brain are dependent upon the sympathetic system for the distribution of vasomotor stimulation, which is the basis of their nutrition. This is the first point that brings out the co-ordination of the two systems in connection with the segmental arrangement, based on the structure of the rami communicantes.

The second point in the segmental arrangement of the nervous system is that there are two important parts of the nervous system, that is, two segments that act together in the control of the organism. The one is the brain area and the other is the vasomotor area (second dorsal to second lumbar). These two are bound together in function, in co-ordinative activities, and in connection with inter-dependent functions.

In regard to the first segment- the brain area. That raises up the question here of brain nutrition. How does the brain nutrition take place? The extent of the cerebral cortex, as a superficial surface, is so large that abundant provision is made for the supply of blood by means of an immense number of small arterial vessels. Therefore one-third of the blood of the body circulates in the brain. How does this circulation take place in the brain? One peculiar characteristic is that all of these arterial walls are equal in caliber beyond the circle of Willis, which is the great center for the arterial blood supply in the brain. Another fact of great importance is that there is no anastomosis of the blood supply in this field. What does this mean? These two facts make it possible to supply to the brain an excess of blood and to distribute this excess in any one cortical area, or in a number of cortical areas, without supplying the same quantity of blood to all of the areas that we find in the brain; that is, one area, two areas or more may be in a state of hyperaemia so far as the blood supply is concerned. What does this mean? That those areas which are hyperaemic are in a state of activity and those areas which are anaemic are in a state of inactivity.

Here comes in the possibility of what is called in psychology the irradiation of impulses. From one cortical area of the brain it may be anterior, to another cortical area of the brain it may be posterior, passing over the intermediate areas without affecting those intermediate areas at all.

The physiological foundation of this psychic principle is that of hyperaemia and anaemia of the blood supply. There is a difference in the brain during sleep and during wakefulness. During sleep there is a regularity in the activity all over the brain except when dreaming and in the movements of the brain, and there is also a diminished activity. During wakefulness there is an irregularity in the activity. Why? Because during wakefulness certain areas of the brain only are active, while all other areas of the brain are equally active. For example, the man who uses his arms has his arm area very active, and the sub-areas that are associated with the arm are also very active, whereas the areas that represent the other movements are inactive, therefore giving us irregularity in the activity of the brain, in its separate areas.

All parts of the brain do not receive an equal supply of blood on account of the difference in activity in accordance with the demands of the body. This is different from what we find in the body. For example, in the lungs, the liver, the heart, there is an equal supply of blood to all the parts of those organs, provided, of course, the organs are in a normal state. All parts of the brain are not acting simultaneously, and hence the law which regulates the blood in the brain is that demand regulates the supply, whereas in the body the law is that supply regulates the demand. What does that signify in the brain? That means in the brain that functional activity of the brain determines the amount of blood circulating in and found in the brain at any particular time. In other organs of the body the blood supply is only limited by what is called the membrana propria surrounding the organ.

In the brain, on the other hand, the brain substance is limited by the fact that it is surrounded on every side by a solid and an immovable structure, which we call the cranium. That hard and immovable anatomical structure prevents an accumulation of blood taking place in the brain, such as might take place in other organs of the body. The blood pressure of the brain is regulated by this immovable skull. The brain does not fill up the cranium entirely; the balance which is not filled by the brain substance is filled up by lymph channels and lymph reservoirs filled with fluid. In the roof of the brain we find indentations corresponding with the convolutions that we find in the brain substance. What does that signify? That means that these indentations in the cranium have been produced by the activity of the soft brain substance. Why do we not find the same modifications in the sphenoid bone at the base of the brain? Simply because at the base of the brain we have a lymphatic cushion. The base of the brain, then is the only part of the brain that represents a soft wall, so that the brain is all the time resting upon the soft base cushion, consisting of those lymphatics that we have spoken of. This is the only thing that makes possible brain activity.

The brain activity depends upon rhythmic and peristaltic movements. These movements and activities are of three kinds, in con-

nection with blood pressure and in connection with brain activity. We discussed these movements before. The one corresponds with the heart, the second corresponds with the lungs and the third corresponds with the vaso-motor system. What prevents compression and concussion of the brain within the cranium? It is the fact that the lymph and the cerebro-spinal fluid yield to the cranial movements. Perfect brain nutrition, therefore, will depend upon two facts

(a) First of all, variations in the blood supply, depending on the anatomical and the physiological conditions of the brain substance and of the cranium. We said that a variation in the brain was possible because the lymph reservoirs yield, and the number of venous spaces and sinuses found in connection with the brain, all of them connected with the longitudinal sinuses, makes it possible for the brain to pass through certain active movements. These spaces and sinuses that we find in the brain are separated from one another simply by a delicate membrane, so that these spaces, sinuses and ventricles practically communicate with one another on different planes, and they fill up the balance of the cranial cavity that is not filled up by the brain substance, so that any enlargement and diminution in the size of the brain will be regulated by the fluids that are found in those spaces and sinuses.

(b) The arterial circulation, is derived from two sources, the internal carotid and the vertebral arteries. These have branches from the meninges and the cerebral arteries, and in connection with the circle of Willis supply all the arterial blood that is supplied to the brain substance. The outer membrane of the brain is nourished by branches from the sulci arteriosi of the basilar bones, that is, the bones that we have in connection with the basal structure of the cranium. The dura mater, which is the outer covering of the brain, has external arteries which throw the blood into the capillaries of the dural membrane, on its inner side, its internal arteries, which throw the blood directly into the large veins without passing through the small capillaries. Therefore, the opposition between the external and the internal blood supply of the dura mater prevents dural hyperaemia.

The pia mater also has arteries which throw the blood across the cerebral cortex, providing for the direct passage of the blood to and from the lymphatic vessels. The outer lymph space, that is, between the dura mater and the arachnoid, communicates directly with the lymph glands in the neck, and the lymph spaces of the peripheral nerves, especially the optic nerve and the auditory nerve, the 2nd and the 8th cranials. This makes it possible for the cerebro-spinal fluid to be thrown down into the lymph glands of the neck and to be thrown down along the sheaths of the different nerves, particularly the second nerve and the auditory nerve, the two nerves which are particularly associated with the semi-circular canals, which is the center, we might say, of the function of equilibrium. The venous spaces and the lymph spaces of the dura mater also communicate with the outer lymph spaces. In the arachnoid membrane, which separates the sub-dural lymph space, there is a network of connection with the pia mater, and this establishes a connection with all of the sub-arachnoid spaces at the base of the brain. All variations in the active move-

ments of the brain regulate the blood distribution and form the basis of the nutrition of the brain. For example, we have lost what we call a pulse wave. That pulse wave represents the arterial pulse, starting from the circle of Willis and going around and across the entire cerebral substance. Then we have a respiratory wave. This represents a wave of aspiration, determining the blood, always from the head down towards the thorax. The intra-thoracic negative pressure acting as a suction pump, intended to draw the blood down from the brain to the thorax; hence, this respiratory wave tends to pull the blood from the venous sinuses, especially from the longitudinal sinus, down to the base of the brain, and if the neck is normal, we have the free tubular channel from the base of the brain down to the thorax and towards the heart.

Now, the third wave is the vasomotor wave. This is a wave of contraction and of dilation, representing the peristaltic and the rhythmic activities of the vessel walls and of the substance of the brain. What makes these movements possible? These movements are possible because of the space that surrounds the brain, which is filled in by the lymph and by the cerebro-spinal fluid.

This gives us the basis of pressure within the brain. For example, when the cranium is opened, it is found that there is considerable pulsation of the cerebral substance. What does that mean? That means intense activity on the part of the cerebral substance. Is there anything to neutralize that intense activity? There is. It is neutralized by the cerebro-spinal fluid within the different cavities.

What is it that regulates all these activities that take place in the brain? They are regulated by the vasomotor wave. Why? Because the vasomotor wave produces a hemispheric contraction and dilation of the mass of the brain, and this makes the regular hemispherical movement that we find in connection with the two sides of the brain, regular during sleep, irregular during wakefulness, depend upon the vaso motor variations. That means that the vasomotor wave regulates and controls the pulse wave and the respiratory wave; therefore the vasomotor contraction causes the pulse and respiratory action to be lessened. Why? Because of the arterial contraction. On the other hand, the vasomotor dilation causes the pulse and respiratory action to be increased, because of arterial dilation. When the stimulation coming from the different parts of the body, originating in any organ of the body or in any peripheral part of the body is carried to the brain it produces changes in these variations. For example, psychic influence, like emotion, produces a dilation of the brain substance. Pain, or an excessive over-stimulation, coming from some peripheral part of the body, causes contraction of the mass of the brain, as we find it in the hemispheres. These hemispheres, normally, act simultaneously, the one side acting in harmony with the other side, but in abnormal conditions the stimulation may be such as to cause one hemisphere to act by itself and the other hemisphere to act by itself, and then we have an in-coordination of the movements, the peristaltic movements, that take place in connection with the brain. These peristaltic variations of the brain substance, then, are dependent upon the rigidity of the cranium and the softness of the lymphatic cushion that lies at the base of the brain.

There are a number of points that we can bring out specifically here, based upon this fact.

(1) In the first place, arterial contraction originates within the brain, at the circle of Willis, and this produces contraction down at the base of the brain. With what result? It raises the brain from the base up towards the roof of the inner cranium, and this causes the blood to be driven forward into the substance of the cerebrum, or of the brain.

(2) Consequently, this contraction from the Circle of Willis and driving up of the blood into the brain pushes the brain substance up towards the roof of the cranium, and that has the effect of cutting off the advance of the cerebro-spinal fluid that was coming down.

(3) At the same time, the ventricular fluid, that is, the fluid that is found in the ventricles of the brain, is driven through the foramen of Majendie into the sinus spaces, the ventricular roof being compressed by the dilation of the upper hemispheres, these upper hemispheres pressing down tightly against the cranium.

(4) Following this contraction of the superior cerebral arteries along the skull, we find the skull cavity acting as a rigid roof, and accompanying this rigidity there is a dilation of the base of the brain, the ventricular fluid being driven beyond the upper cerebral parts of the brain into the sinuses and the pachionian bodies giving suction force to these as lymph hearts, sucking the lymph from the cerebral field and drawing it towards the dura mater.

(5) The final result of this is that this fluid is driven into the sheaths of the nerves and into the lymphatics of the cervical glands. What does that mean? The starting of the cerebro-spinal circulation downward into the body, where it is going to discharge its special trophic functions in relation to the different tissues of the body.

When contraction takes place in the hemispheres and the ventricles become dilated, and this produces an increased secretion of the ventricular fluid and this is the fluid that is sent out

- (a) along the nerve sheaths for trophicity,
- (b) along the spinal cord to supply the spinal cord and (c) the lymphatics in the cervical region which is concerned with the trophic function in relation to the different tissues of the body- the general lymphatics of the body and the body tissues.

All of this is regulated by the vasomotor control, the centers being found (1) in the great vasomotor center in the medulla, and (2) in the segmental centers in the 2nd dorsal and 2nd lumbar regions of the spinal cord, so that the body, through this vasomotor spinal area, reacts on the brain

- (a) to cause it to secrete the cerebro-spinal fluid, and
- (b) when it has secreted this cerebro-spinal fluid to cause it to distribute it to the different parts of the body.

This has a bearing on the nutrition of the body as well as of the brain. The nutrition of the body cannot be perfect unless those processes that we have spoken of in relation to the brain are normal; hence the necessity of so often treating, in a general way,



the vasomotor area in order to cause the brain to function normally for the purpose of body nutrition.

It also has a bearing upon headaches. A headache, for example, that begins at the top of the head and presses right down towards the base of the brain and the spinal cord is a headache that involves a venous congestion of the head, and the only way to relieve that headache is to relieve the venous blood supply from the head. How?

The best way of relieving that headache is, first of all, to relax all the tissues around the subocciput region and the upper cervical region, in order to free the jugulars. Secondly, stir up the activity of the thorax in order to increase the thoracic suction force; and thirdly, rotate and flex the head freely on the axis, in order to stimulate the blood that is in the brain to move down out of the brain when you have opened up the path and when you have stimulated the suction force within the thorax.

Another kind of headache is what is called the pulsating or throbbing headache. That is a headache that always starts at the circle of Willis, back between the eyes, and is an arterial blood headache. The only way to relieve that pulsating headache is to relieve it by pressure from the frontal part of the head to the opposite subocciput part of the head; that is, lay one hand on the front of the head and the other on the subocciput; push the head back and press between the two points, in order to stimulate the passage away of the accumulated cerebro-spinal fluid which stands wedged in between the arterial blood and the brain substance, keeping the arterial blood in a state of congestion. The brain exerts its control over the nerve fluid; vasomotion exerts its control over the tension as a force in arteriole circulation.

The other kind of headache that we have to deal with is the headache which feels as if it were pressed in a vise. That is the vasomotor headache. Why? Because each hemisphere contracts and dilates by itself and at times of hemicrania one side contracts more than the other and when we have the vasomotor disturbance that contraction is intensified. It is a vasomotor disturbance, an exaggeration of the whole vasomotor function. In the body this exaggeration appears as tension; in the brain it is congestion of the cerebro-spinal fluid. The way to relieve that headache is to relieve it through the vasomotors in the spinal area and down in the body:

- (a) relax the dorsal area, the lumbar area and even the sacral area of the spine; and
- (b) that will cause a demand for blood down in the abdominal and pelvic regions of the body, which will pull down by suction the blood from the brain and relieve the vaso-constriction in the brain. In this case to treat up in the neck would exaggerate the headache.

Why? Because if we treat up in the neck we meet here the centers for the vaso-constrictor function in the head, and by treating those centers we increase the headache. Of course, in all of these cases lesions, if present, are to be corrected.

Another point that we note is that the segmental arrangement depends upon Head's Law. We have discussed Head's Law before.

The principle point that is brought out here is muscular contracture. In acute and chronic diseases of all kinds we have to deal with certain muscular contractions along the spinal column on either side. What does that mean? That muscular contraction means, or represents, a reflex effect of some irritation of the branches of the sensory nerves which pass into the spinal cord, the other branches of which are distributed to the muscles along the spine. These contractions, in other words, are the result of some irritative changes which take place in an organ or some of the tissues. To remove the contraction of these muscles will restore the normal circulation of the organs affected through the vasomotor system, and this will tend to restore the organ to its normal condition. This treatment is applied, in this particular case, by steady pressure over the point of contracture; that is, supposing we find a contracted area of muscles at the 9th to the 12th dorsal, we will apply as close to the spine as possible steady inhibitory pressure over that area. This inhibitory pressure presents two points to be noted:

(1) that the inhibitory pressure should be applied between the spinous processes and the transverse processes, and

(2) that the inhibitory pressure should be upward and outward; that is, take your fingers, put them in at an acute angle, and push upward and outward, not downward, but always upward and outward. The reason of this is that you push directly into the interspaces that lie around the separation of one vertebra from another, and the articulation of the head of the rib with the transverse process.

This phenomenon, muscular contraction along the spine, depends upon the sensory nerve distribution, so that the important point here is to know what parts in the spine represent the different organs that we find in the body.

In this segmental arrangement we must emphasize the special fields in which Osteopathy is carried out. OSTEOPATHY proper, as distinguished from massage and medical gymnastics, is based on:

(A) A theory of diagnosis which attempts to explain the etiology of disease, based on distinctive lesions that are found in connection with particular results or effects that we call diseases. These lesions may be found in any of the elements (proximate principles) or structure or activities of the body. This may be of one of two types:

- (1) The original or causative lesion (primary), or
- (2) The secondary maintaining or sustaining lesions, that is, the lesion which maintains the abnormal function or the abnormal activity. This means that the distinctive function of the lesion theory is not misplacement or malposition, but MALADJUSTMENT in the pathology-physiology.

This maladjustment produces obstruction that gives rise to irritation or pressure or some other form of obstruction that interferes with:

- (1st) the vitality, or,
- (2nd) some of the vital processes.

This results in either case in throwing certain parts of the body out of order and this out of order condition we call the pathological condition. Remember, however, that this is not the cause but it is the result. The cause is some obstructive lesion. These lesions depend on the definite landmarks found in the body.

One important point that we may lay down as a principle is that nearly all disturbances begin on the sensory side. Therefore the so-called primary lesions are functionally sensory. Therefore, the sensory landmarks are of the greater importance in discussing the etiology of the disease.

The SENSORY LANDMARKS, Osteopathic, referring to vertebrae relations.

The heart is represented by the 1st, 2nd, 3rd and 4th dorsal.

The lungs are represented by the 1st to 5th dorsal.

Primary heart and lung diseases are associated with the 1st to 5th dorsal vertebrae and the 1st, 2nd, and 3rd ribs, because of the involvement of the intercostal nerves and the deep spinal nerves.

The stomach: 6th to 9th dorsal. The stomach area is to be divided into two areas:

- (1) Cardiac end of stomach: 6th-7th dorsal and
- (2) Pyloric end of the stomach: 8th-9th dorsal.

The body of the stomach is represented by the right pneumogastric nerve, both sensory (primary nerve function) and motor (anastomosing nerve function).

The location of the pneumogastric for the stomach is just above the clavicle. It lies just external to and behind the carotid, so you can locate it by means of the pulsating carotid.

In these two points for the two ends of the stomach remember that the two ends work in opposition to one another, for example, if you work on the cardiac end for dilation, work on the pyloric end for contraction and vice versa.

The intestines (small) from the duodenum to the caecum, 9th-12th dorsal.

The Large Intestine to the sigmoid flexure: 12th dorsal and 1st lumbar.

This latter is of importance chiefly in cramping and choleric pains, strong inhibition being applied at this point chiefly on the left side.

Stomach pain can be controlled at the 11th and 12th dorsal, but this takes place through the splanchnic nerves through the solar plexus and is the visceromotor type of pain, that is, over-stimulation.

The Rectum, including the intestine from the sigmoid flexure down to the external anus: 1st-4th sacral, principally in rectal tenesmus, rectal paresis, or paralysis and hemorrhoidal pain. This is one of the most important points that we come across in osteopathic work, viz: the fact that the intestine is divided at the sigmoid flexure. This accounts for more failures in treating constipation, osteopathically, than anything else that we know. Simply the ignorance of many osteopaths that it does not terminate at the sigmoid, whether it is a case of vasomotor or motor constipation. The same this is true of diarrhoea. If it is a vasomotor type of constipation, the treat-

ment in the two cases is entirely different, and the important point is that if it is a motor type the treatment of it as a vasomotor type will aggravate, and vice versa. Motor constipation is always associated with the sacral region, that is, with the rectum below or the intestine below the sigmoid flexure.

The Liver and Gall Bladder: 7th to 10th dorsal on the right side; 7th, 8th and 9th ribs on the right side, principally in the pain of gall-stones.

The Spleen: 8th, 9th and 10th dorsal on the left side.

The Kidneys (Pelvis of the Kidney) and Uterus: 10th, 11th, and 12th dorsal and 1st lumbar. Inhibit here to control sensitive pains without interfering with the labor pains. Kidney colic, for example, in Bright's Disease, gives us lesions in this area, mostly posterior conditions of the vertebrae. The same is true of uterine diseases. This area is again divided into two parts. The upper part of the uterus is marked by the 10th dorsal, also the pelvis of the kidney. The lower part of the uterus and the uterine orifice is at the 12th dorsal- 1st lumbar.

The Bladder: 11th, 12th dorsal and 1st lumbar. When the pain originates from over contraction, that is, muscular, if the mucous membrane in the neck of the bladder and the mucous membrane of the bladder itself are involved, for example, what is called stone in the bladder, the 2nd, 3rd and 4th sacral nerves.

There is another point in connection with the bladder that is of importance. Where there is an excessive dilation, failure or inability to contract in connection with the bladder or the neck of the bladder, we find painful conditions and these are associated with the 11th and 12th dorsal and 1st lumbar.

The Prostate Gland: 10th dorsal to 5th lumbar. This has a large spinal field because it has a large blood circulation and also a very complicated nerve supply. In prostatic enlargement, or in prostatic inflammation, inhibit strongly from the 5th lumbar up to the 10th dorsal.

Genital System in General: 10th- 12th dorsal and 1st lumbar. This is the spinal region for contracture conditions of tetanus, for example, in a prolonged case of labor where persistent contraction is maintained without the necessary dilatation, give strong inhibition in this area downward. On the other hand, to control sensitive pain that is associated with that contraction, inhibit at the 9th and 10th dorsal.

In excessively relaxed uterus following labor, give strong stimulation in this area and you can strengthen this by grasping the uterus through the abdominal wall.

The Epididymus: 11th & 12th Dorsal, 1st lumbar.

Testes in the male and Ovaries in the female, 10th dorsal. There is one point to note here particularly. These are exactly at the point where you have irritations in connection with the upper part of the uterus and the pelvis of the kidney and ovaries and very often it is almost impossible, when you have painful conditions, to tell which one is involved, because they both represent the same area.

The appendages in connection with the genital organs, both male and female, 11th and 12th dorsal, and 1st lumbar.

Uterus, for the contraction of the uterus, that is, painful contractions in connection with the uterus, 10th, 11th, 12th dorsal and 1st lumbar.

Os Uteri: 1st, 2nd, 3rd, 4th sacral and 5th lumbar.

Now, there is an important point here obstetrically. We distinguish between points that represent pain, and the pains that represent contractions. Suppose you have a pain that to the physician would call for morphine, chloroform, etc. The osteopathic treatment is strong inhibition from the 5th lumbar down through the sacrum. Why? because that represents the center for the sensory impulses which always in that case begin from the os uteri. Supposing we wanted to stimulate or inhibit in connection with the contractile pains, it would be at the 10th dorsal down to the 1st lumbar. Now, supposing you wanted to stimulate the contraction of the uterus in order to assist the parturition process. Stimulation would take place from the 10th dorsal down to the 1st lumbar, not below the 1st lumbar, because the 2nd and 3rd lumbar is what is called the parturition center in connection with the motor centers. Therefore, the Cervix of the Uterus is represented by the 5th lumbar to 4th sacral. This region is used for the application of two kinds of treatment:

- 1st: To produce cervical dilatation in an obstetrical case, treat downward in this area, giving strong stimulatory treatment;
- 2nd: in a case of threatened miscarriage, strong inhibitory treatment in the same area. In this case, however, treat upwards.

In both of these cases give specific treatment only. Do NOT give general treatment, because the general treatment stirs up the circulation and interferes with the condition in either case.

This summarizes all the sensory areas that we find in the body. Almost all diseases originate on the sensory side, therefore, an inhibitory treatment is always called for, because in dealing with sensory conditions we want to cut off the impulses from the sensory side so as to modify the motor side through the sensory side. This line of treatment is important chiefly for palliative purposes, because in this way we are able to prevent the condition from becoming established; in other words, we have the power of aborting the disease.

As the sensory areas, they represent the different organs registered along the spine. They will, therefore, mark out the points of contracted muscles which will require to be relieved by inhibitory pressure, as well as in cases of pain involving the sensory nerves.

The segmental arrangement of the body takes in the different areas of the body. In order to lead up to that we require to discuss the subject of the nervous system in relation to vital lesions. There are three classes of vital lesions that require to be taken account of:

(a) In the first class we have the lowering of the vitality, that is to say, we find a patient in whom vitality is low, that is, there is little reactive power in the patient of the nervous system. That reactive power is the only basis we have for treating with the expectation of curing a patient. If the patient will not react to treatment of any kind, there is no chance at all of curing the patient, so that in those cases where we have little, if any, reactive power the case is practically an incurable one.

(b) The second type of vital lesions is where we find the nervous system too weak to function the vital force. That we can best illustrate probably by simply referring to the class of patients in whom it is found, that is, consumptive patients, for example, those who have pulmonary tuberculosis, or phthisis, as it is commonly called. In that case of patients the vitality is great. The patient, even up to the time of death, has vitality in hopefulness of living from twenty to thirty or forty years. In those circumstances when the patient has sufficient vitality and while the patient wants to live, and hopes to live, why is the patient incurable? Simply because in that case the nervous system is so weak that the vital force is unable to function the body. Recent pathology has explained that very nicely. Dr. Mays, who has gone over some thousands of cases of pulmonary tuberculosis, or phthisis, finds that in ninety-nine percent of those cases there are lesions involving the nervous system, and in the vast majority of those cases involving the pneumogastric nerve. "There is sufficient pathological evidence for believing that the integrity of the vagi is always impaired in pulmonary consumption." T. J. Mays, M. D. N. Y. & Phila. Med. Journal, Sept. 3, 1904, p. 437. Pulmonary consumption a nervous disease.

That is the reason why in those cases that the patient is unable to live—because the nervous system has become so debilitated by lack of nutrition and resultant degeneration, that the vital force is unable to function the body through the nervous system, and the nervous system is the only medium that we have for the functioning of the vital force.

That is brought out even in the medicinal treatment. A great many medicinal prescribers nowadays say that medicine is dangerous in those cases. Why? Because if you give a strong medicine, you will cause such a reaction of the vital force that the whole body will be thrown into a state of turmoil and excitement, and reaction in that

case will be absolutely impossible; in other words, the nervous system is not able to sustain the stimulation of the nervous system through the vital force to that extent, and therefore the patient collapses. For that reason the modern tendency is to treat those tubercular cases from the standpoint of diet, climate and so on. That indicates the point from which we look at pulmonary tuberculosis, that is, as a vital lesion, in which the nervous system has become so depleted that the vital force is unable to lift up the body to itself and to keep it within the plane of vitality. The same thing is true of all malignant diseases.

(c) The third class of vital lesions is a class of vital lesions that involves the vitalized fluids of the body. The best illustration of this, probably, is found in inflammation. Inflammation is usually discussed in the field of pathology, but inflammation is not a pathological process. Inflammation is a physiological process. What does that mean? Why is there an accumulation of fluids in a particular part? It is because of the lowered or injured or irritated state of vitality locally, on account of which the vital force sends to that local part as much of the vitalized fluids as it can possibly send to help that injured or weak part to get over its weakness or its injury, if that is possible, so that in inflammation we have a congestion followed by an inflammation. That is the physiological side of the process. From that point we have the pathological side of the process; that is, if there is a breaking up of the inflammatory material, then we have the pathological side, but not until then, so that from that standpoint this may be taken as an illustration of a vital lesion involving the vitalized fluids. The point that we want to bear in mind from our standpoint is that these fluids are not simply fluids but they are vitalized fluids; that is, in virtue of the contact of the blood, of the lymph or of the cerebro-spinal fluid with the vital force, these fluids have become vitalized, and they are sent out to particular parts of the body in excess, in order to attempt to rescue those particular parts from what might be called the hands or clutches of disease, so that this vital inflammatory process that we find, and we may find it anywhere in the body, is a lesion, expressive of the need of the vital force, just as pain expresses the need of the vital force to be helped in its struggle against what we have called disease causes, or disease conditions.

These are the three fields in which we have what are called vital lesions. All vital phenomena are to be explained in relation to the nervous system, because the nervous system is the medium through which vitality is distributed to the different parts of the body, and it is also the medium through which all communication is established between the different parts of the body. All physiological phenomena are characterized by manifestations of attributes or characteristics of nerve tissue. What are those attributes or characteristics of nerve tissue? They are four: Mobility, Irritability, Conductivity and Trophicity.

Physiologists speak of the nerves as discharging three great functions, - nutrition, motion and sensation, - but behind those three functions that are discharged by the neurones we have these four essential properties or characteristics of the nerve tissue;

and these four characteristics represent the vitality of the nerve tissue, so that these four characteristics are the attributes of the nerve tissue as vital phenomena. Therefore, all diseases that involve the nervous system are simply perversions of some one or more of these four attributes, perversions in other words, of the state of vitality or of the attributes that are characteristics of that state of vitality which manifests itself through the nervous system, so that whatever abnormal or pathological conditions we find in the body, or in any part of the body, represent some change in some one or more of these attributes of nerve tissue, because these are the vital characteristics. This is the reason why all symptomatology can be classified under these four heads, and the reason why symptomatology is physiological and not pathological.

When we speak of nerve tissue we must bear in mind that that includes muscle tissue, because mobility and irritability of muscle tissue depend upon the mobility, irritability, conductivity and trophicity of the nerve tissue; hence, sometimes we speak of the nerve tissue as the master tissue of the body. Why? Because it is the medium of expressing all of the characteristic vital attributes of the vital force, and unless these different tissues of the body are vitalized in this way they are not living tissues, they are dead tissues.

The nerve system consists of cells and fibers and end organs, as we have found already. The fundamental basis, however, of the nervous system is what is called the neurone, that is to say a cell with a fiber which is the prolongation of the cell outside of itself, and from this prolongation of the cell, or from the cell, we have dendritic branches that branch off just in the same way as minute twigs branch off from the trunk or main branches of a tree. So that the nervous system consists of a great mass of these neurones combined together and accumulating in the formation of what are called ganglionic masses; a ganglionic mass, for example, in the brain, in the spinal cord, in the sympathetic ganglia and in what are called the prevertebral ganglia. For example, the solar plexus, the hypogastric plexus. These we will come to speak of afterwards.

It is important that we should know what is meant by these four attributes of nerve tissue: (a) The first attribute is mobility. Mobility is the primary characteristic of all living tissue. No matter how low down it is in the grade of life, either animal or vegetable, mobility is a characteristic that it possesses in virtue of its relation to what we have called already the waves of vibrations, which, representing the immaterial (whatever that may be) animate all living substance.

(b) The second attribute is irritability. It has been defined as a power of responding to a stimulus, any kind of stimulus, - chemical, mechanical, thermal and so on. A muscle has this irritability, but it possesses it only insofar as the muscle is animated by the nerve. Now what is this irritability? This irritability is the power which the nerve tissue possesses of being irritated, that is, the power of permitting to be generated certain impulses within itself, these impulses being of the nature of vibrations, akin to the primary attribute of mobility.



(c) The third attribute of nerve tissue is conductivity.

What is conductivity? It is simply the power which the nerve tissue possesses of transmitting the irritability, or of transmitting the impulse or the wave of vibrations, which represents both the primary and the secondary mobility of the nerve tissue, and this irritability is transmitted by conductivity to the other tissues of the body; that is, all nerve tissue is conductile in the sense that every irritation that is produced within the nerve tissue representing an activity is transmitted along the fiber or through the cell into some other tissue with which this nerve tissue is in communication. One interesting point that deserves to be noted here in relation to conductivity is that conductivity is never lost until there is the complete solution of continuity of the nerve tissue; that is, as long as you have the continuity of the nerve protoplasm there is conductivity. Pressure, even pressure to the extent of destroying the characteristic structural conditions of the nerve tissue, if it does not divide the nerve tissue in two, will not destroy the power of conductivity. Another point that comes in along this same line is that the irritability is destroyed, even after the conductivity is preserved, in the case of the injury or the seeming destruction of the nerve tissue.

(d) The fourth characteristic that we mentioned was trophicity.

By trophicity we mean the influence which the nerve tissue exerts over all the other tissues of the body; that is, that is the function that represents the complement of nutrition. Trophicity and nutrition, therefore, are complementary to one another. Trophicity represents the function of the fluids of the body to furnish the materials which are to nourish the different tissues of the body, so that nutrition and trophicity are carried on side by side with each other, in connection with the vitalized fluids of the body. That is the reason why we mentioned so specifically one of the vital lesions as a lesion involving the vitalized fluids of the body. This is of very great importance. Why? Because the function of nutrition comes in to take those food materials that have been digested and metabolized and to carry them in the vitalized fluids of the body to the different tissues. But this is not sufficient to bring the tissues up to the standard of normal tone. A tissue may receive a mass of nutritive materials and still be out of tone. Why? Because of the lack of this trophic function which is exerted through the nervous system over all the cells, tissues and organs of the body; that is, every tissue, cell and organ of the body, if it is normal, ought to be in a nutritive condition, in a tonic and in a trophic state. What does that mean? That means, in the first place, that we must regulate the food supply in order to obviate what we may call "food lesions."

Writers have laid down a set of principles which are necessary in order to have a normal food supply. For example, the body must receive all of the proximate principles of the body in the form of food. These proximate principles must be in definite proportions to one another and the sum total of these proximate principles in the form of food must bear a definite proportion to the amount or volume of the body. In addition to that, the food supply must be furnished to the body in a sufficiently varied form to prevent the body from falling into a state of dietetic monotony.

These are the principles that are laid down in connection

with the supply of the food materials to the body. If these conditions are followed, the food that is supplied will be digested in the alimentary canal; it will then be metabolized in connection with the liver and the muscles, and now it is ready for the trophic function. This trophic function is necessary, because the tissues will not take up food unless they are stimulated to take up the food by the nervous system. In addition to this, the trophic function of the nervous system supplies a vitalized fluid which is necessary to the assimilation of the food material to that tissue. That vitalized fluid we find in the form of the cerebro-spinal fluid which we found before was generated in the brain and sent down along the path of every nerve to every part of the body. When the nervous system is in active operation it communicates its own vitality to all the tissues in the form of nerve force, vitalizes those tissues through the vital fluids which it produces and controls, then every tissue of the body is in a trophic state and only then do we find the tissues in such a tonic and trophic condition as to entitle to be called normal.

This brings out one point, namely, the absolute necessity for the unity of the nervous system. If this nervous system presides over every cell, over every tissue and over every organ of the body in its nutrition, in its tonicity, in its trophicity, there must be a unity of plan and of purpose in that system, otherwise the body would not be a commonwealth of cells in the form of an economy. This unity of the nervous system is the great fact that binds all the different parts of the body together; it is the great fact, especially, which binds together the deep and the superficial areas of the body.

In this nervous system we find included, first of all, the masses of the nerve cells, or the neuron cells that constitute the central nervous system. In addition to this, secondly, it contains the nerve trunks, and these nerve trunks represent masses of afferent and efferent fibers representing the different motor fibers; for example, vaso-motor, viscero-motor, secreto-motor, pilo-motor and so on; and the different sensory fibers which communicate between the superficial parts of the body, which are subject to sensory impressions, and the sensorium, which is the great seat of the vital force. In those nerve trunks we get, as the main factors, the thirty-one pair of spinal nerves, containing anterior and posterior roots; the anterior roots which govern the different motor activities of the tissues and organs of the body, and the posterior roots, representing the sensory fibers, which convey the sensory impulses from all the tissues and organs of the body up to the spine and brain. It also includes the twelve great cranial nerves which come out directly from the brain and communicate with the greater part of the body, uniting the visceral functions particularly of the thoracic and abdominal cavities to the visceral function of the cranium.

One important point that we must bear in mind here in connection with these nerve trunks, and the motor and sensory fibers which make up these trunks, is that these fibers have no function in themselves; they function only in relation to a cell. The cell of which these fibers represent the prolongation is the functioning part of the nervous system, hence, any fiber, anywhere in the body, may have what is called double conductivity; that is, it will conduct an impulse in both directions.

That is the basis of an important fact in relation to treatment. If we can reach any fiber, or any set of fibers, at any particular point in the nervous system, stimulation or inhibition will excite a series of impulses in those fibers which will be conducted in both directions along both sets of fibers. That answers the question of whether we have any direct means of communicating with the great cells which govern and control the nerve fibers. We have. Because when we stimulate or inhibit the nerve fiber, the impulse will be conducted in both directions, both to the central point and to the peripheral point in connection with the nerve fiber.

That leads up to the point that was the main topic of discussion, segmentation. What is segmentation? Segmentation is the structural characteristic of the nervous system. What do we mean by that? We found before that the body is divided up into segments from its earliest origin in embryonic life. We found at the same time that the nervous system in the embryonic life is segmented first in two,-- first the sympathetic nervous system, which is first in origin, representing the visceral activity of the body as a body and of the organs of the body as organs; secondly, the central nervous system, first originating along the spinal cord and first developed within the spinal cord in the cervical region of the spinal cord. All the rest of the nervous system is an outgrowth by elongation and budding and bifurcation-- a development by processes of evolution from these two primary segments that we find in the nervous system.

(1) In the adult nervous system the brain stands by itself as the climax of nervous tissue, the ultimate master tissue of the body, in which we have located the great mental and vital force, and especially the inhibitory control which the brain exerts over all the nerve tissue which is below itself, and through that tissue over the body.

(2) The spine represents the most fundamental part of the nervous system in the human subject, and in fact in all forms of animal life, because, even in animals where there is no brain we find the spinal cord. (See Hanley "Spinal Cord".) In the development of the spinal cord in embryological life, the development takes place in segments; the somites of the embryo represent the bodies of the different vertebrae and both of these represent the segmental process that takes place in the development of the nerve tissue as it reaches out from the great centers in the spine into all the different organs and tissues and cells throughout the body, so that the great centers of segmentation in connection with the nervous system are localized along the spine. Segmentation (1) in the vertebrae; (2) in the muscles; (3) in the ligaments and cartilages; (4) in the blood vessels and (5) in the nerves-- thirty-one pairs of spinal nerves.

That subject we discussed somewhat before in connection with the embryological field. If segmentation is the structural characteristic, what is the functional characteristic of this segmentation? Structure, as we found before, is of no value to the body, or to any part of the body, unless it has a differential value or a characteristic function. The functional importance of segmentation lies in this, that segmentation is the basis of the differentiation of reflex actions; that reflex action is the functional characteristic of segmentation. What do we mean by that? That a reflex action is the basis of the functional activity of the body, of its organs and of its cells. What

is a reflex action? The most simple reflex action and that which is the basis of all the more complicated reflex actions that we find in the nervous system consists of what is called a reflex arc, in which we find a center or a cell, with two nerve fibers, one sensory and one motor, and at the periphery of each sensory and each motor fiber a terminal organ.

That is the simplest reflex action that we have, and that is the basis of all the more complicated reflexes that we find in the body; that is, the spinal cord consists of a great mass of segmented cells, the segment corresponding with the individual vertebra, and these segmented cells are continually receiving impulses. As they receive these impulses they are sending out impulses, hence there is a continual stream of impulses coming in and going out,—coming from the superficial parts, both internal and external of the body, and going out to the deep parts of the body along the motor paths, and vice versa, that is, coming from the deep parts and then going out to the more superficial parts.

There is no time in the life history of the body when the body is not receiving external stimuli. What is the function of these external stimuli? The function of these external stimuli is to arouse the different sensory terminals that we find all over the superficiality of the body. These sensory terminals excite and arouse impulses, which are transmitted along the sensory fibers to the cells in the spinal cord, which receive those impulses; these receiving cells then transmit them to other cells, which modify and classify, and these cells transmit them to another set of cells, which distribute the impulses out along the motor paths to the different activities and active organs and tissues that we find in the body. Hence, life from the standpoint of the nervous system, consists of a perpetual series of reflexes, that is, there is kept up constantly a stream of impulses inward and outward, and that represents what we may conveniently call the cycle of nervous vitality. The basis of this, is the vibratile impulse, because that is what an impulse means.

In combining these points, we may lay down this as an absolute principle, that the segmental structure of the spinal cord and column, and the reflex action that is based upon that segmental structure, show that definite muscles, and definite organs, and a definite cutaneous area are innervated from the same central nervous area. What is the conclusion we draw from that? That impulses originating in the superficial area are reflexed through the cells in the spinal areas to the different muscles and organs throughout the body, and vice versa, from the different muscles and organs through the cells in the spinal cord to the superficial area or areas of the body.

What does that mean so far as therapeutics is concerned? That we have here the means of tracing out the relation of every minute cutaneous point on the surface of the body through its relation to the different muscles, organs and tissues of the body, the medium being the segmental cells that we find in the spinal cord. That segmental series of cells that we find in the spinal cord must communicate with the superficial cutaneous parts of the body and with the deep tissues and organs of the body in one of two ways, either through the cerebro-spinal system, directly, or indirectly through the sympathetic nervous system.

That takes up the entire nervous system, the whole nervous system being combined in that series of reflex areas from the spinal cord, - the brain being regarded as a periphery, just as the visceral organs are are periphery, in the same sense as the skin over the surface of the body is to be regarded as a periphery. This makes the spine the great objective field of segmentation - brain, organs and superficial tissues being the ultimate field in which the segmentation expresses itself in some form of activity. What is the importance of that from the standpoint of diagnosis? That the mechanical irritation of a nerve, either by a bone, a cartilage, a muscle, or a ligament, will set up one of three possible conditions. In the first place, it will produce an irritation of the nerve tissue, directly causing a change in the physical or in the chemical condition of that nerve tissue. The simple pressure will do that. Secondly, it may produce an alteration in the irritability or the vital physiology of the nerve tissue, and this may take place either in the form of increasing or exciting that irritability or of lowering that irritability. In the third place, the conductivity may be altered, but the conductivity, as we said before, will not be destroyed unless there is a solution of the continuity of the tissue substance. These are the three points which lie at the base of any mechanical change that is produced by pressure or otherwise, from bone, cartilage, ligament or any other tissue structure of the body encroaching upon or pressing upon the nerve tissue substance.

That leads up to the point where we are able to lay down distinctively the field of what we may call mechanical diagnosis. In the first place, we will have to take account of the condition of the functional reflexes, that is, those reflexes that we said before are based upon the arrangement of cells in the segments of the spine will require to be taken account of to find out whether these reflexes are functioning normally or abnormally. That is the reason why, as we mentioned before, we require to palpate over the spinal area to find out tender spots, painful spots, hot and cold spots, etc. What is indicated, or what is signified by these different spots, - hot, cold, painful, tender? These indicate abnormal conditions of the reflexes. For example, if we find a tender spot at the sixth dorsal, that will indicate an abnormality of the reflex that functions from that point. The reflex that functions from that point is the reflex that functions in relation to the stomach, so that when we find a painful, tender, hot or cold spot at that particular region, we at once conclude that that is a diagnostic indication of some gastric disturbance. What that gastric disturbance is, the nature of it, we will speak of later. This is only the indication of where we are to look for the lesion.

That is the first point that is to be emphasized in the field of diagnosis, and what we have said about that one particular point at the sixth dorsal will be true of all the reflexes of the body, of all the reflexes from the spine and of all those reflexes that are spoken of and described in physiology as the physiological reflexes.

The second point to be emphasized along this line is the objective symptoms. In the first place, changes in muscular tonicity, or in the tonicity of the other tissues, especially the fascia or connective tissue, and the skin; the skin being a distinctive tissue by itself. Secondly, changes from the normal in the skeletal adjustment. This includes the relation of bone to bone, the relation of bone to

ligament and tendon and cartilage to bone and muscle, and the relation of nerve supply to the different soft tissues, blood supply to the different soft tissues, etc. All of the different elements that go to form the make-up of the skeletal structure. The nature of these lesions we have described already.

The third point to be emphasized in connection with the diagnosis is this subjective symptoms. You will notice the order in which we place these symptoms. The most of the other schools put them in the reverse order, but we begin at the reflexes, to find out the condition of the reflexes. Why? Because that represents the functioning of the vital force in connection with the different parts of the body, and we want to find out, without being told anything by the patient himself or herself, what that vital force is doing and how it is functioning in the different parts of the body. Then we go to the objective symptoms; that is, those changes in the alignment of the different structures of the body, to see how mal-alignment will tally with the abnormality in the reflexes, and last of all we come to the story of the patient, to see how that story will tally with the other points, namely, the objective points and the conditions of the reflexes. These subjective symptoms represent all the patient can tell of himself or herself, and these are to be explained, and are explained, or attempted to be explained, in relation to the two points that have preceded. That is, if we find pain, we do not simply say that is pain. If we find pain at a particular time of day, we are not satisfied in taking that as the patient tells us, but we take that and explain it back through the change in the reflexes, and through the change in the structural alignment. Why? Because, that is the physiological expression of the inner condition of the patient's life, and if it is a physiological expression of the inner condition of the patient's life, it ought to be the same, or to express itself similarly to the way in which the body expresses itself, because body and mind are a unit. Hence, from that standpoint, we trace up the condition from the more superficial until we get to the deeper, the deeper points that are involved in the mental and vital force activity of the patient.

(B) Another principle which underlies the Osteopathic theory has reference to the principle of treatment, namely, that there is a definite relation between every organ of the body and the central nervous system. This relation between the central nervous system and the organs, is established in two ways:

1st: Through the segmentation of the spinal cord and the spinal column, being marked by an anterior and posterior nerve roots, representing a set of nerves coming out through each foramen in the spinal column, furnishing sensory, motor and communicating fibers to the sympathetic system side.

2nd: Through the sympathetic nervous system which is also segmented in connection with the sympathetic ganglia that lie on either side of the spinal cord, extending as a chain from the ganglion Cervicale to the ganglion Sacrale. Here we have a real segmentation field; here we have ganglionic segmentation. These ganglia correspond in general with the spinal vertebrae, although in some regions there are fewer ganglia than vertebrae, for example, in the cervical region there are only three ganglia corresponding with seven vertebrae. The difference in number is made up for in the difference in size, the two upper cervi-

cal ganglia being very large. In the dorsal region the ganglia are very small and correspond with the vertebrae, except the first dorsal vertebra. Fibers pass through the sympathetic system to and from the organs.

In connection with the peripheral part of the central nervous system, that is, the anterior and posterior nerve roots of the spinal nerves in the thirty-one pairs of nerves, also the branches of the sympathetic system connected to the spinal nerves by communicating fibers, we have a complete relation established between the brain and spine on one side and every other portion of the body on the other. In this way we have not only the means of reaching the brain but every other organ of the body and we can reach the brain through the organs or the organs through the brain. Hence we have complete control of all the nerve circuits within the body.

The difference between the cerebro-spinal and sympathetic systems is that the segmentation of the sympathetic system is not complete. The cerebro-spinal system in the spinal cord has the most complete segmentation in the dorsal and lumbar regions. In the cervical and sacral regions it is not complete. The segmentation, from this point of view, represents the co-ordinated distribution of nerve energy. The brain is the generator of all nerve energy and force and the spine is distributive. This nerve force is distributed to all parts of the body through the sympathetic subordinate centers: 1st: In the spinal cord; 2nd; through the media of the sympathetic ganglia; 3rd: through the media of the lateral ganglia, and 4th: through the prevertebral plexuses, for example, the solar plexus.

These connections are established through the osteopathic centers, or at the foraminal points, because at these foramina we find the exit and entrance of the nerves. The nerves are located in connection with the spinal vertebrae, because variations in the adjustment of the vertebrae to one another and of the vertebrae and soft tissues represent disturbances of the nerve force.

Osteopathic work is either palliative or curative. In case it is palliative, the object is to mitigate pain or relieve some inflammatory condition, exudation, accumulation, etc. The principle part of the work in connection with the palliative treatment is the relaxation of muscular contractures. This work is done mainly through the sensory nerve connections.

Curative work has a three-fold object in view. Curative work is (a) Corrective. In speaking of curative work being corrective I mean corrective of irritability. All treatment is, or ought to be, directed to the vital force through the principle or property of irritability, which is characteristic of tissue, because all tissue is irritable. The most highly irritable tissue that we have is the nerve tissue; and every lesion, it does not make any difference what the nature of the lesion is, involves some modification in the irritability, so that the principles of treatment and the practical side of treatment bring out the appeal to the irritability, or to the vital force through the irritability. Now the first method in which we can appeal to that irritability is to correct the irritability. By that we mean the correcting of some condition of the muscles, bones, ligaments, nerves, blood vessels and so on which alter or modify irritability. Whenever you have a displacement of any kind of tissue, there you have an alteration or modification in

the irritability, and the correction of that condition means the correction of the irritability, and ultimately, an appeal to the vital force.

The second method in which we treat is by inhibition of the irritability. In this case we have hyper-irritability at a particular local point, and that hyper-irritability is lessened by steady pressure over the particular point. The resultant of the inhibitory treatment is the particular case is to equalize the impulses of irritability, to distribute them equally among all the different parts of the body, using the vital force as the great governor or governing principle in that distribution.

The third method or principle of treatment is the stimulation of the irritability. In case irritability is abnormal, here we have an under-irritability and the resultant of stimulation, which is applied by moving pressure or vibration of some kind, is to cause an equal distribution of that irritability, bringing more irritability or impulses of irritability to the part which is under-supplied, and in that way equally distribute the irritable impulses throughout the different tissues and parts of the body.

These are the three methods that we make use of in connection with curative work, and for that reason we appeal more largely to the motor, or efferent, side of the nervous system in curative work.

In palliative work we appeal more directly to the sensory side that is, palliation is aimed to check pain, to inhibit the excessively stimulated processes which are leading up towards the pathological conditions of the tissues; whereas, in connection with curative work we use those three methods, not to palliate a condition but to restore the adjustment-co-ordination and co-operation among structures and tissues through the nervous apparatus, that is, the motor (efferent) side of the nervous apparatus. In this case it is well to remember that while we apply correction, inhibition and stimulation to irritability on the mechanical basis, we use it on the basis of physiological mechanics or physiological physics, and we appeal to the body not as a mechanism but as an animated mechanism. There are a great many illustrations of physics or mechanics in connection with the body. We have the pump, both the force and the suction pump. We have different types of levers, in fact all the physical levers that are discussed in the field of general physics. Then we have the pulley systems, etc. We must remember that we are not applying the principles of treatment absolutely on a physical basis, but on a physiological-physical basis. What does that mean? That means that, supposing we take a pump as an illustration. The heart is a pump, both force and suction. From the physical side, from the general physical side, a pump is of very little use to anybody unless it has a handle; pump and handle are of very little use unless you have some one pumping, or a force to pump it. Reasoning back in that direction it is not the pump that is the all important part. The handle is of more importance than the pump and the force that moves the handle is even of greater importance than the handle.

All old physiologies and systems of practice speak of the heart as one of the vital organs, because it is the pump. This is a purely physical view of the heart. I do not think it is so. I do not think that is true. Behind the physical principle of the pump we have the physics of the handle of the pump, and we have the physiology of the force that moves the handle of the pump. What is the handle of the pump in connection with the heart? The handle of the pump in connection



with the heart is represented by the vaso-motor system, that particular nervous system which goes directly to the smallest arteries, the most minute arteries throughout the body, including the brain. The heart could do no work at all itself if it were resisted by the small arteries; in fact, one of the most common causes of disturbance involving the heart is what we call vaso-motor paralysis, or paresis. What does that mean? Simply that the heart is checked because of paresis and a consequent paralysis of the small arteries. Why? Because of the cutting off of those distinctly vaso-motor impulses that require to go to the small arteries if the circulation is to be kept normal and this reacts on the heart. That leads us back to the vital force. It is vitality coming out in the form of a stream of impulses, waves of vibration from the brain, distributed from the spine through the vaso-motor system on the two sides, through the constrictor apparatus in connection with the distinctive sympathetic system, and through the dilator apparatus in connection with the distinctive ~~sympathetic~~ <sup>parasympathetic</sup> system, that we get the regulation of those small arteries. Here we have the wheel that turns the heart, the handle that moves the pump and keeps that force of circulation going from time to time in the history of the individual.

That will illustrate how lesions involving the motor, or vaso-motor side of the apparatus, will come in as the most important points in connection with the different types of disease. Anything that will obstruct or impede or impair the action of that vaso-motor system will affect the heart and the circulation, and everything else that is involved in the body, because the circulation is the foundation practically of the functional activities of the body.

From this standpoint we may look at the subject of treatment with a general or with a specific view. First of all, from the general standpoint. General treatment is called for in most cases of disease. There are certain functions that we always require to control if we are to keep the body in a normal state. Let us put that in another way. The body, if it is in a state of adjustment, has certain organic activities, and these organic activities always require to be adapted or adjusted to one another. General physiology discusses circulation, respiration, nutrition and so on by themselves, as if they were independent functional activities, but they are not; it is simply for convenience sake that physiology discusses these separately. Circulation, respiration, nutrition and all the other organic activities act in harmony, and they must act in harmony if the body is to be correctly adjusted to itself and the ~~various~~ different functional activities that we find within the body. These are the three great fields in which general treatment is brought out, or given:— Circulation, respiration, nutrition.

In regard to circulation,— Circulation is controlled from three standpoints: First, it is controlled from the standpoint of vaso-motor nervous system. Why? Because the vaso-motor nervous system represents the handle which moves the pumping force, and that pumping force, of course, moves the blood, so that if we are to regulate the circulation of the blood we must always begin at the vaso-motor nervous system. Now, the great vaso-motor nervous system in connection with the control of the blood supply, the general blood supply in the body, we find in the upper cervical region, that is, in the region of the superior cervical ganglion of the sympathetic system: (a) the superior cervical ganglion, and (b) first five spinal nerves, 1st to 4th cervical vertebrae. The question is sometimes asked why that is the great center

for vaso-motion in connection with the body generally. It is simply this. That superior cervical ganglion lies between the head (including the brain) and the body, and it is what we might call the mediating influence (vaso-motorly) between the brain and the body, the brain being the great governor and the body the field in which the government takes place, so that all vaso-motor influences that are distributed from the brain in connection with the body, and from the body in connection with the brain must pass through the superior cervical ganglion.

Now there is one point that we must remember here in connection with the superior cervical ganglion, and that is that while it is the center for the general body vaso-motion, in connection with the middle and the inferior cervical ganglion, the superior cervical ganglion by itself is the local center for the brain, the eyes, the face, the nose the mouth and all of these local parts that are associated with the head and the brain. The second point in connection with the general circulation is the region of the accelerator fibers to the heart. This is a special field in contrast with the vaso-motor field which is sympathetic. This region we find from the second to the fifth dorsal, a region which represents the origin of those impulses which have an augmentor action on the heart through the sympathetic nervous system, because the sympathetic nervous system and its impulses represent the accelerating forces. Compared with this spinal cord field we find the middle cervical ganglion of the sympathetic- visceromotor accelerator to the heart.

The third point from which the general circulation is regulated is the great splanchnic area, that is, the splanchnic region which contains the vaso and visceromotors to the great arteriole capillary network of the abdominal blood vessels. The importance of this will be gathered from the fact that the mesenteric blood system is sufficiently large to contain the entire volume of blood that we find in the body. Supposing that the blood gets down into this mesenteric field the result will be an absolutely static condition, because it will be very difficult if not impossible, for the blood to get out of that pool on account of the fact that it is so large and that it contains such a volume of blood gathered from all the different parts of the body. On the other hand, supposing we have a congested state of any other part of the body. This, the anterior-capillary mesenteric- is the point which we can always open up and to which we can bring the blood there from the other congested parts, on account of the fact that it is so large and it will contain such a volume of blood. So that the great splanchnic area, from the fifth to the twelfth dorsal, represents the third point at which we are able to control the congested circulation of the blood in other fields of the body. These are the three areas, then, from which the general circulation of the blood is controlled, and where general treatment will be applied in connection with general circulatory conditions. The articulation of the 5th to the 12th dorsal vertebrae and the corresponding ribs gives us the vaso- and visceromotor reaction. The method of treatment in this case is (a) strong articulation through the splanchnic area- 5th to 12th dorsal; (b) followed by strong articulation along the spine to direct the congestion towards the splanchnic area.

Respiration was the second function. Respiration is controlled primarily, through circulation; in this case not the systemic circulation but the pulmonary circulation; that is, the circulation of the right heart and the circulation of the blood from the right heart to the lungs and back from the lungs to the heart. In connection with the right side of the heart, we have the centers (a) first of rhythmic heart rhy

thm, at the third, fourth and fifth dorsal. Then (b) we have the centers in connection with the valves; those centers we find in the same region—second, third and fourth dorsal. (c) The bronchi and the lungs are controlled from the seventh cervical down to the sixth dorsal; also through the pneumogastric nerve, which represents the motor impulses to the lungs. The pneumogastric nerve is located for lesion and for treatment at the atlas and axis, and along the sheath of the carotid blood vessel.

Another point in relation to respiratory control is the fact that respiration is a muscular phenomenon. That muscular phenomenon depends (a) on the relaxation of all the skeletal muscles; (b) upon the mobility of each separate rib, from the first and second at the base downward, and (c) also upon the mobility of the thorax as a whole. This calls for what is termed raising the thorax, especially in connection with deep breathing. Respiration cannot take place if the rib mobility and thoracic elasticity are interfered with; hence, in order to stimulate general respiratory action we require to free the ribs, sometimes to separate the ribs, and we require to stimulate the play, the freeplay, of the thorax as a whole. This is best done in one of three ways:

First: You can have the patient sitting up, and you can put the thumb at the angle of the second rib, and when you put the thumb at the angle of the second rib push up on that rib while you take the arm and lift the arm above the head, and move it around backward <sup>and down</sup> while keeping up pressure at the angle of the rib. Go down to the third rib, and so on down to the seventh rib in the same way. In that way, rib by rib, you will raise up and separate the ribs in connection with their relation to one another.

The Second way of doing that is to lay the patient straight down on the back and put in the fingers, three fingers, at the second and third ribs (the angles of the second and third ribs) and press outward and upward, while you take the arm and pull it above the head strongly, push the arm out at an obtuse angle to the shoulder and push the arm back as far as possible. Then pass down to the next two ribs, and so on until you get down to the eighth rib.

The Third way of doing that same thing, and that is the method of separating the thorax and raising the thorax as a whole, so as to give the thorax free elastic play, is to have the patient laid straight out on the table. Throw the arms out at the sides of the table. Then put in one hand at each side underneath the patient, raising the forearm on the axilla; put in the hands until you reach the head of the ribs; then pressing with the forearm against the axilla, push upward on the thorax, and in that way you will spread out the ribs and push them forward anteriorly and raise the thorax. Make the patient breathe deeply while treating. This will spread the thorax and ribs and raise the thorax.

In any of those three movements along with the mechanical treatment, make the patient expire and inspire freely, and you will get the elastic action of the lungs and you will also get the elastic action of the thorax, so that these points, along with the points in relation to the bronchi and lungs, will give us the means of getting at, from a general point of view, the function of respiration.

The third function that we included among those that were to be treated generally was that of nutrition. Nutrition is dependent on (a) circulation and respiration. (b) It is also dependent on the condition of the stomach, the intestines and the liver. Hence, in addition to the treatment for general circulation and general respiration, we require to look after the stomach and the intestines and the liver from the viscer-

motor side. The stomach gives us the area from the fourth to the seventh dorsal; fourth and fifth represent the cardiac orifice; sixth and seventh and probably the eighth and ninth represent the pyloric orifice. In addition to that we have the pneumogastric nerve in relation to the body of the stomach, located on the right side just above the clavicle.

We sometimes speak of the stomach as a sac, held tightly from the two ends by the spinal nerves coming out from the anterior roots of the fourth, fifth, sixth, seventh and probably eighth and ninth dorsal nerves, while the body of the stomach as an organ, lying between these two points, is controlled in its different movements by the pneumogastric nerve. The peristalsis, including the churning movement, the rotary movement and the forward movement, as well as the geying movement to and fro, - these are controlled by the pneumogastric nerve, and especially by the right pneumogastric nerve. The best point at which to get at the right pneumogastric nerve in this particular case is down along the sheath of the carotid, as close to the clavicle as you can get on the right side only.

In regard to the intestines, they take in the small intestines and the large intestines and cover an area from the fifth dorsal, in connection with vaso-motion, to the eleventh dorsal; from the ninth dorsal in connection with visceromotor motion, to the fourth or fifth lumbar, and if we include the rectum, to the fourth or fifth sacral. That is the area which represents both the vaso-motor dilator and the visceromotor nerves in connection with the intestines. The pneumogastric nerve is distributed to the intestines down to the sigmoid flexure.

The liver is represented by the area of the eighth and ninth dorsal on the right side, some say as high up as the sixth dorsal, but specifically, the liver is represented by the eighth and ninth dorsal on the right side. (b) The liver can also be treated in connection with vibration, right over the cartilage, the anterior cartilage of the eighth and ninth ribs, through the liver reflexes. (c) It can also be treated by elastic mobility (affecting the visceromotor rhythm), placing the one hand on the anterior thorax over the region of the eighth and ninth ribs, and the other hand posterior, and pressing elastically between those two points. That will give the rhythmic response of the liver and the elastic mobility of the lower part of the thorax.

Now these are the points which are involved in the field of nutrition, and there is one other point that requires to be noted particularly in connection with nutrition, and that is the receptaculum chyli, the reservoir or receptacle in connection with the fatty material that is absorbed from the intestines, that is thrown into the lacteal system, to be carried along the lymphatic ducts and ultimately thrown into the blood. The receptaculum chyli lies opposite the second or third lumbar vertebra, and its nerve supply is at the second and third lumbar vertebrae. The thoracic ducts and the lymphatic connection with the subclavian venous blood supply is found in connection with the first rib as it articulates at its head with the first dorsal vertebra, and especially over the transverse processes of the last three cervical vertebrae, anterior. The meaning of this is that if you want to stimulate the lymphatic system, which is quite an important point in connection with nutrition, begin by stimulating (by articulation) at (a) the second and third lumbar; or, if the muscles in that region are intensely contracted, begin by relaxing, by inhibition, all the muscles in that region, and then stimulating; or give the rhythmic treatment at that region; then pass (b) up to the region of the head of the first rib, and attempt to

treat the head of that first rib, either by articulating the rib or by pressure at the head of the rib in its relation to the first dorsal vertebra; then pass to (c) the anterior transverse processes of the fifth, sixth and seventh cervical vertebrae, and thoroughly relax all the soft tissues that may be hard in that region, and then stimulate right over the transverse processes.

If you want to stir up the lymphatic system from the washing function side in its relation to the thorax, that is the point of treatment. For example, that is the osteopathic treatment in the beginning stages of pneumonia. The purpose of the treatment is to flush the lungs with an over supply of lymph. That is done by relaxing the tissues around the anterior transverse processes of the last three cervical vertebrae and thoroughly stimulate right over those transverse processes for some time. That will set up a stream of lymph down into the thoracic cavity, and will cause that lymph to pass in connection with the lungs, the object being to flush the lungs. Now these are the three points from the general standpoint in connection with treatment, the three great functions that we have to deal with, - the circulation, the respiration and the nutrition, - and that will cover, as we said, the general treatment.

In regard to the specific points (and here, as we said before, this refers to the motor side of the nervous system), the distribution of the motor nerve supply to the different organs. In discussing the principle of segmentation, as applied to the spine, we will first take the vertebrae; and afterwards we will take the different organs or parts of organs that are supplied by the different nerve supplies. First of all the atlas - the first cervical vertebra.

The ATLAS represents the center for distribution in connection with vaso-motor disturbances, lesions of the eye, the ear, the face and the nose, also medulla conditions through the posterior spinal nerve branches; the stomach and heart through the tenth cranial nerve and its anastomosing branches; the bronchi and the base of the lungs also through the tenth cranial nerve.

The AXIS with the THIRD CERVICAL VERTEBRA, represent the centers involved in general disturbances of the vaso-motors through the superior cervical ganglion involving the sides of the head, the face, the eyes, the nose, the pharynx, the tonsils and the blood vessels of the brain and the body in general; also the center for the heart through the left superior cervical ganglion; the center for the stomach through the right superior cervical ganglion. For example, palpitation of the heart, or in spasm of the stomach, may be controlled by inhibition over the superior cervical ganglion on the left and on the right sides respectively; epileptic fits associated with the solar plexus may be controlled through the right superior cervical ganglion in most cases.

The SUPERIOR CERVICAL GANGLION is sensory in its function in relation to the heart, and is located at the second and third cervical.

The MIDDLE CERVICAL GANGLION is motor-accelerator in relation to the heart, and is located at the fifth and sixth cervical vertebrae.

The INFERIOR CERVICAL GANGLION is motor-inhibitory in its relation to the heart and is located at the seventh cervical and first dorsal vertebrae. To increase the action of the heart directly, articulate at the head of the third and fourth ribs on the left side. To stimulate sympathetically, stimulate the middle and inferior cervical ganglion. This, however, although more direct, is more in the nature of a shock to the heart. In some cases of heart troubles we get reflex

actions on the pneumogastric nerve at the heads of the third and the fourth ribs and this articulatory treatment is contra-indicated in most cases because of its irritating effects.

The THIRD, FOURTH and FIFTH CERVICAL VERTEBRÆ represent the motor-accelerating function outside of the heart, representing the centers involved in pericardial disturbances, especially pericarditic; in disturbances of the phrenic nerve, especially in hiccoughs and in some types of goitre; also the diaphragm involved in some types of asthma; in some cases of abnormal heart action and in some cases of liver trouble we also find lesions, but the lesions are through the pericardium, diaphragm or phrenic. These are general vaso-motor centers establishing connection between the central nervous system and the localized organs, especially through the distribution of the phrenics to the diaphragm, pericardium, liver, etc.

The FIFTH and SIXTH CERVICAL VERTEBRÆ represent the middle cervical ganglion, especially in diseases affecting the thyroid glands, for example, goiter, diseases of the heart secondary to goitre; exophthalmic goitre. It is the sympathetic center for the acceleration of the heart rate; also the center in pupillary disturbances in the eye secondary to the heart trouble and goitre combined. The disturbance of the pupil of the eye may be reflex from this inferior cervical ganglion region or from the upper dorsal. In the latter case it is vaso-motor, in the former case sympathetic, and therefore, sensory.

The SIXTH and SEVENTH CERVICAL VERTEBRÆ represent the lymphatics, especially in connection with the bronchi, the lungs and the thorax in general.

Note here particularly that the accelerators of the blood to the eyes and heart are located at the same point. This is a very important point because it explains many of the supposed unexplainable conditions found in connection with diseases, for example, the relation on the eyes to palpitation of the heart; the same condition is established between the stomach and the eyes, the liver and the eyes, etc.

The whole cervical region has several points to be noted, with three great functions, general vaso-constriction, local vaso-motion and kidney centers.

1st: The general vaso-constrictor function along the sides of the spinous processes in connection with the sympathetic ganglia to the face, head and neck and brain superficially, on account of the sympathetic ganglia receiving fibers from the second, third, fourth and fifth dorsal area.

2nd: Dilator fibers pass out at the level of the ganglia or at the level of the individual vertebra from which they pass, in connection with the cervical spinal nerves. These vaso-constrictors and vaso-dilators affect the whole body so that from the first cervical to the sixth cervical is spoken of as the great vaso-motor region for the body in general. Constrictors through the sympathetics and dilators through the anterior nerve roots from the spine.

3rd: Local vaso-motors are found distributed from the cervical sympathetic ganglia directly to the face, the neck, the head and the brain. Here we find the importance of the neck in all involvements of the head, the face, the nose, the eyes, the mouth and the heart, the same side of the neck. Local control from these vaso-constrictors and dilators is increased over the head, face, eyes, etc. from this cervical region through the sympathetics and the anterior roots of the spinal nerves.

4th: The first five posterior spinal nerves send up branches within the cranium, distributed to the basal ganglia and to the medulla especially; hence, the upper half of the cervical region represents (a) the point of control of the vital processes through the medulla function; (b) the control of co-ordination; both general and particular, through the basal ganglia and the pyramidal tract.

5th: We can reach the brain blood vessels in the cervical region in two ways: (a) According to Head's Law, the superficial blood to the scalp being from the same source as the deeper supply to the vessels of the brain, the same thing being true of the nerve supply, hence, the method of reaching the brain blood vessels is the manipulation of the scalp. Tight contraction of the scalp and basi-occipital tissues produces constriction of the blood vessels in the brain. To reach the brain condition in this case give strong inhibitory treatment right over the scalp and basi-occipital tissues so as to produce relaxation of the scalp. Also in the region of the first four cervical vertebrae. (b) Note that the vice versa of this law is also true, that is, relaxation of the scalp and basi-occipital tissues will mean great contraction of the blood vessels in the brain and consequently anemia of the brain. In this case the treatment will be inhibition.

This means that whether the soft tissues are relaxed or contracted inhibition is the method of treatment. The only difference is that in contracted conditions we begin to inhibit at the base of the cranium, in relaxed conditions begin at the forehead. After you get a tonic state of the scalp then apply stimulation: (a) by vibration, either with the instrument or the hand, lightly; (b) by the semi-circular moving pressure. Do not apply stimulation until the tonic state of the soft tissues is restored, otherwise the atonic state of the tissues will be aggravated. (c) Strong inhibitory pressure over the outer table of the cranium, applied all over the cranium. This will affect the blood supply: 1st, to the inner table of the cranium; and 2nd: to the meninges of the brain. In applying this treatment begin always at the base of the cranium and apply it only when the soft tissues have been restored to the tonic condition. In this case also always treat the patient lying down, never in the sitting posture.

6th: Another great center area that we find in the cervical region is a kidney center and a center for the uterus, in connection with the general vaso-motors of the whole body. This is a point that is not generally recognized, and yet we find frequently lesions in the cervical region involving both the kidneys and the uterus. Why? Because, if you will remember in connection with the blood supply of both of these organs, the blood supply is direct from the abdominal aorta, both in relation to the kidneys and the uterus; blood pressure of the heart is blood pressure of the kidneys, blood pressure of the heart is blood pressure of the uterus; therefore anything of lesion that will involve the heart from the blood pressure side in this cervical region will at the same time affect the kidneys and the uterus.

THE DORSAL REGION begins at the seventh cervical.

The SEVENTH CERVICAL and the FIRST DORSAL represent the center of the inferior cervical ganglion of the sympathetics, through which the nerve fibers go as they pass to the heart, thyroid gland, vertebral and basilar arteries. Note particularly this last point because this is the strongest point at which to reach the arterial blood supply to the brain in

anemia and hyperaemia of the brain, and this is the field of lesions in these cases. This means that the greatest control that we can have over the brain is through the vertebral artery, but the strongest and most immediate control is gained through the carotids.

In treating the vertebral circulation, catch the transverse processes at the seventh cervical or first dorsal between the finger and the thumb and then press the head of the patient backward on the pressure that you are exerting with the finger and the thumb on the seventh cervical and first dorsal, for example, in congested conditions. In anemic conditions press the head back on the fingers and thumb, pull the head backward and forward, that is, pressure is followed by relaxation. Foreexample, take the case of a patient who is always more or less dizzy, or who is always sleepy. Here is a condition in which there is a deficient arterial blood supply or an over-supply of venous blood. In this case apply the second type of treatment.

We reach the inferior cervical ganglion best at the head of the first rib. The Annulus of Vieussens is the point where the pneumogastric nerve and its laryngeal branches with the depressor nerve, form a ring around about the subclavian artery; therefore it is a point where we can catch the blood supply of the subclavian, the nerve supply of the heart and the nerve supply of the larynx. This is also the region for the inhibitory function to the heart through the inferior cervical ganglion.

It is also the center for the thyroid gland, the inhibitory function in connection with that gland, and it is the center for the control of the blood supply to the brain through the vertebral and basilar arteries. Hence, one of the most common points of lesion in all brain disorders is at the seventh cervical and the first dorsal, interfering with the vertebral and basilar blood supply in connection with the brain.

THE SECOND and THIRD DORSAL VERTEBRAE represent the cilio-spinal center, ~~Kxxxxxxx~~ in connection with the ciliary muscles of the eye. For example, strong inhibition at this point will produce dilatation of the pupil of the eye, strong stimulation will produce the reverse. This is a very important point because in this way we can dispense with artificial means of dilating the eyes, or the reverse. For example, in testing the eyes in photophobia, exophthalmic goitre and the various forms of inflammation of the eye. In some cases in which the eye is said to be in an incurable condition, for example, in which is diagnosed by many doctors as optic atrophy, we can test the curability or incurability by a strong electric current, the application being made at the second and third dorsal for diagnosis only. If the optic atrophy is real the results will be negative. If the condition is curable there will be produced sparks, rays or colors in connection with the eye of the patient that is visible to the patient.

This is also the center for vomiting (motor reflex). Strong inhibition by pressure at this point <sup>not</sup> will control vomiting in most cases. This is done, undoubtedly, through a reflex in connection with the pneumogastric nerve.

THE SECOND to FIFTH DORSAL VERTEBRAE represent the center for acceleration of the heart (spinal). Note particularly that these are the cerebro-spinal accelerators, for example, these are the centers at which to stimulate the heart in case of fainting when the patient becomes unconscious and the heart becomes weak, not in the ordinary cardiac weakness, but when there is unconsciousness along with the cardiac weakness, that is, the cerebro-spinal side of the heart is weak.



In other cases where the patient is conscious we get the best results through the sympathetic system through the superior cervical ganglion. In this case where there is heart weakness without unconsciousness locate the points of treating (a) at the superior cervical ganglion and (b) at the middle cervical ganglion on the left side, located from the upper end of the second to lower end of the fourth cervical vertebrae. This is the large field of blood control in connection with the weakness of the heart action with a patient conscious and remember that it is **ONLY ON THE LEFT SIDE**. If you treat the right side in this case you will produce trouble in connection with the stomach, likely; that will aggravate rather than correct the heart condition and the aggravation will probably be vomiting.

The **SECOND to SIXTH DORSAL VERTEBRAE** represent the great center for vaso-constriction in relation to the heart and lungs, representing: (a) the vaso-constriction of the pulmonary blood vessels directly and (b) indirectly through the pulmonary plexuses the heart vaso-constriction.

This is a very important point particularly in some diseases, for example, pneumonia, because in reaching the heart through the lungs and producing constriction we have the means of co-ordinating the blood circulations of the heart and lungs: (a) in volume, and (b) in the circulation between the heart and lungs, the same center controlling the heart and the pulmonary blood circulation.

This represents the only type of vaso-motion, namely, vaso-constriction that we find in connection with the lungs. The importance of this in pneumonia appears from the fact that doctors acknowledge that they have no specific means of treating pneumonia, because they have no remedy that will ask on the heart and lungs to co-ordinate the blood supply. If they give a heart depressant it will also act as a lung stimulant, and vice versa. In the osteopathic field, however, we have the means of getting vaso-constriction at the same time in both organs through the pulmonary plexus. We treat the pulmonary plexus from the second to the sixth dorsal on both sides, because we get the effect through the pulmonary plexus which is distributed to the lungs and then to the heart. In reaching the pulmonary plexus we also reach the tenth cranial nerve and that is the cerebro-spinal side of the nerve supply to the heart.

Therefore, strong inhibitory treatment should be given often in case of pneumonia or threatened pneumonia from the second to the sixth dorsal; for example, in very acute cases every two or three hours. In this way we control both the heart and the lungs. In this case treat the patient lying on the back. Put your fingers under the patient and push right up under and around the spinous processes, pressing sufficiently to push the body upward from the table so as to get a strong inhibition.

In speaking of pneumonia this is the one case in which treatment must be specific, that is, no general treatment is called for, unless during the period of convalescence. Many osteopaths who have no knowledge of the treatment of acute cases give specific treatment from the second to the sixth dorsal and general treatment, or vice versa. In either case this is bad for the patient. In pneumonia the rule is to let the general circulation alone because the quieter a patient can be kept from the general circulation standpoint the better for the patient. This means that specific treatment is not to be given at the third and fourth dorsal, because that could increase the systemic circulation.

THE SECOND, THIRD and FOURTH DORSAL VERTEBRAE represent the center of cardiac rhythm, particularly in connection with the intermittency of the heart, the regulation of the heart beat in connection with the force of the heart and the rhythm of the heart action.

The FOURTH and FIFTH DORSAL VERTEBRAE represent the specific center for heart force in connection with rhythmic regularity of the heart beat and variations from the normal in intermittency. Here we have also the center for the superficial circulation. Therefore, it is the co-ordination existing between the superficial circulation of the body as a whole and the force of the heart.

The THIRD TO SEVENTH DORSAL VERTEBRAE represent the vaso-motors to the arms in connection with the distribution through the brachial plexus. This is very important: (a) in angina pectoris, and this explains why we have pain of constriction going down into the fingers, radiating from the heart field. (b) in cases of swelling of the arm, for example, we find sometimes in diseases, especially where the lungs, thorax, mammary glands, axillary lymphatic glands are involved, that the arm becomes swollen. The only point at which we can control this is through these vaso-constrictors in the third to the seventh dorsal area. Give no treatment to the arm, but articulate the third to the seventh dorsal. Here we have exaggerated dilatation. Why? Because the constrictor centers (third to seventh dorsal) are weak in action. The kind of treatment called for is strong stimulating treatment in that region, just as strong as it can be given.

The third, fourth and fifth dorsal, sixth, seventh and eighth dorsal vertebrae, all combined together, represent the center for the stomach, on the right side. This center is divided up into two parts, the sixth, seventh and eighth dorsal being the general stomach center, the third, fourth and fifth dorsal the special stomach center. This is the center of peristaltic action controlled through vaso-motion. The general vaso-motor centers are third to ninth dorsal, including the oesophageal and duodenal connections with the stomach. The second and third dorsal is what is called the cilio-spinal center, that is to say, the center in connection with the eyes and co-ordinating the eyes with the action of the heart through its blood supply, and with the action of the vaso-motors in the upper dorsal area, that is the vaso-constrictors.

This is also the center for vomiting (second and third dorsal). Persistent vomiting can be controlled by strong inhibitory pressure at the second and third dorsal in most cases. Second and third dorsal is also the center for the large bronchi and the minute bronchial tubes.

THE FIFTH TO TENTH DORSAL VERTEBRAE represent the Great Splanchnic area in connection with visceral activity. Inhibition in this area gives the viscerogastric constriction of the blood vessels, stimulating the secretions of the stomach and the intestinal glands. This inhibition is applied especially in relieving congestions in any other part of the body. Here we have:

(a) An important point for treatment, for example, in hyper-acidity of the stomach, that is, excessive activity of the secretory function. The treatment to be given here is strong stimulation (5th to 10th dorsal). In typhoid fever we have a similar condition but of an opposite nature, namely, the lack of secretion; the treatment here, therefore, would be inhibition in typhoid fever (5th to 10th dorsal.)

(b) This area (5th to 10th dorsal) controls the largest area of blood supply in the body; hence this area is to be opened up by inhi-

bition in relieving congestion in other parts of the body. Open up the splanchnic field of blood by inhibition from the fifth to the tenth dorsal in cases of pneumonia and then treat by articulation from the pulmonary in the spine to and through the splanchnic area to pull the blood away from the lungs. This will give better results than by using cardiac stimulants, because in giving the stimulant you stimulate the heart to drive the blood from the heart to the lungs, not from the lungs to the other parts.

THE NINTH TO THE TENTH DORSAL VERTEBRAE on the right side represent the center for the liver, particularly peristalsis and rhythmic action. On the left side the spleen center for peristalsis and rhythm also. On both sides there is a center for chills (9th to 10th dorsal) specific or localized, as in malaria. In the treatment of general chills (a) control the general circulation through the heart and vaso-motion; (b) (fourth and fifth dorsal); (c) control the liver and spleen at the 9th and 10th dorsal. In both cases inhibition.

The center for reaching the uterus through the hypogastric plexus is also here (8th to 10th dorsal). This is an important point in reaching uterine disturbances, if the uterus is to be reached in relation to other organs. If the uterus is to be affected or to be reached as an organ standing alone, you will reach it best in the lumbar region.

THE TENTH, ELEVENTH and TWELFTH DORSAL and FIRST LUMBAR VERTEBRAE are the centers for the small intestines, the kidneys and ovaries: (a) in connection with the peristalsis and rhythm of these organs, and (b) vaso-motorly.

THE TENTH, ELEVENTH and TWELFTH DORSAL is the center for the vaso-motor type of constipation, particularly on the left side. Similarly in diarrhoea.

THE NINTH, TENTH and ELEVENTH DORSAL represent the Lesser Splanchnic in its visceral function in the thoracic and abdominal fields, through the solar plexus.

THE TWELFTH DORSAL is the center for the renal splanchnic, directly on the kidneys through the renal plexus, with the co-ordinating anastomosis established by the lesser splanchnic through the solar plexus, that is the kidney is controlled via both the renal and solar plexuses.

THE LUMBAR REGION, properly begins at the second lumbar. This is an area that is more like a true region, that is, less confused and more distinctively regional.

THE SECOND and THIRD LUMBAR VERTEBRAE represent the centers for micturition, parturition and defecation on the motor side. The second lumbar is also a center for the uterus, that is, the body of the uterus.

THE SECOND, THIRD and FOURTH LUMBAR VERTEBRAE are centers for lesions in connection with diarrhoea of the motor type. The vaso-motor type of diarrhoea has its center at the 11th and 12th dorsal on the left side. The difference between these two centers is, the 11th and 12th dorsal is the center for vaso-motor diarrhoea, the 2nd, 3rd and 4th lumbar for motor diarrhoea. That is, we distinguish between diarrhoea produced by a blood cause and diarrhoea produced by some irritation directly to the motor nerve supply.

THE FOURTH and FIFTH LUMBAR VERTEBRAE represent the center for general control of the pelvic organs via the hypogastric plexus and through the aortic plexus, forming the pelvic plexus of fibers.

THE FIFTH LUMBAR represents the anterior nerve supply which has a splanchnic function to the rectum, the bladder, the uterus, the vagina, the sphincter ani; also the visceromotor to the same organs, the visceromotor fibers run directly to the body of the organ representing the more mature part of the organ.

THE SACRAL REGION. The sacral nerves in their anterior division represent the homologues of the white rami in the dorsal region, and as such they have a splanchnic function, (a) to the rectum, the bladder, the sphincter ani, the vagina and uterus, and (b) they also represent visceromotor nerves, supplying the same organs, as organs. The second and third sacral represent the same direct nerve supply that goes to the bladder; the fourth sacral the same direct nerve supply, visceromotor to the vagina; the fourth and fifth sacral the same direct nerve supply, that is, visceromotor nerve supply to the sphincter ani, and the second, third and fourth sacral through the hypogastric plexus to the os uteri, in connection with contractions of the uterus controlled by and originating in the os uteri, which always begin in the cervical region and then pass to the fundus or body of the uterus.

THE SECOND AND THIRD SACRAL represent the visceromotor and splanchnic nerves to the bladder; also visceromotor-dilator fibers to all of the organs in the pelvic field, going direct to the organ from the spine.

THE FOURTH and FIFTH SACRAL represent the visceromotors to the external rectal sphincter. There are two sphincters, the external and the internal, the control of the one takes place voluntarily, the other involuntarily, as a reflex or automatic activity. This is also the hemorrhoidal center, that is, the vaso-motor center for the hemorrhoidal blood supply (innominate lesions common in hemorrhoidal conditions); also the center for reflex sympathetic irritation, produced by action of toxic agents in connection with the ganglion impar.

The cause of trouble in connection with the visceral organs is nearly always irritation, because by the law of the "pathway of least resistance" the weakest part will be open to attack. Both the sympathetic chains on the two sides of the spinal column are reached through the fifth sacral and the coccygeal centers in connection with irritation of the ganglion impar.



ovarian organs just in the same way as the heart includes the lungs. The uterine plexuses constitute the pelvic brain.

1. Solar Plexus.....Trunk Brain.
2. Cardiac Plexus.....Thoracic Brain.
3. Mesenteric Plexus.....Abdominal Brain.
4. Pelvic Plexus.....Pelvic Brain.

These are the four great fields of separate sympathetic life, representing, if we chose to call them so, the trunk, the thoracic, the abdominal and the pelvic brains. In these four great fields can be independently carried on the sympathetic life (the visceral processes). We must remember, in dealing with conditions from the osteopathic standpoint that these separate fields may be independent. That is, conditions may exist that render these fields independent of each other viscerally.

These local vitalities are co-ordinated and harmonized, as well as held in check, by the cerebro-spinal vitality. For example, at birth the cardiac field of the child is practically independent. This is marked by the rapidity of the heart rate and the pulse beat averaging 140. This means sympathetic life dominating. As the cerebro-spinal system gains control when the cells of the cerebro-spinal system mature in connection with neurotic development, the rate of the heart beat and of the pulse decrease because they are held in check and controlled by the cerebro-spinal system.

Nervousness is the typical disease that is associated with modern civilizations. Why? Because it is a reaction of the different nerve brains to the weakening of one or more of the fields of nerve action, or control.

Nervousness assumes different forms: (1) Cardiac nervousness, for example, in the majority of cases being associated with rapid heart action, especially spasmodic, such as palpitation and the angina heart. Why? (1) Because of lack of control in the cerebro-spinal system over the field of the heart. (2) There is a return, or a tendency to return to the infantile condition in which the heart is separate from the cerebro-spinal system control and is under the control of the sympathetic system. This is one of the originating causes of neurosis, the lowering of the vitality on the cerebro-spinal side and the elevation of the vitality on the sympathetic side.

(2) Another form of nervousness is what we call nervous dyspepsia. Here the field is not the cardiac field, but the mesenteric field. That is, the vitality from the cerebro-spinal side is lowered and from the sympathetic side is elevated in this mesenteric field. The stomach and intestines run by themselves and they run at such a rapid rate that they run away with themselves and the consequence is that the nervous exaggeration becomes so great the control is lost.

(3) In the pelvic field we find exactly the same condition. Pelvic diseases of modern times are legion. But they all have the one characteristic of congestion. In this case the neurosis is more exaggerated than it is in the other two fields, because: (1) The blood in the pelvic region is not able to look after itself without the help of the other two fields. (2) The nervous system in the pelvic field is less subject to the control of the cerebro-spinal system and is more automatic and reflex in its action. (3) The pelvic field lies between the trunk and lower extremities, hence any abnormality found in the lower extremities always reacts on the pelvic field to weaken it.

III. Co-ordination side of the vitality. Co-ordination between the force and the process sides is the foundation of normal vitality. In the co-ordination of the vitalities (vital force and vital processes) of the organism (vital processes) we recognize the spine as the great objective point:

(1) Because the spine is the field of the vital reflexes, at least in their organic distribution. The reason we make this distinction is because the medulla is the great center field of the reflexes in origin, the spine is the great field of the reflexes in distribution.

(2) The spine is divided into segments corresponding to the different fields of activity in the body.

(3) In the spine we find a great mass of nerve cells, neurones, which have to do with (a) Trophicity, in connection with the cells in anterior horn area. (b) Vaso-constrictor cells (neurones) from the second dorsal to the second lumbar, in the posterior vesicular column of the cord. (This is the column that is added on to the cord in that region, not found above or below.) It represents a very small arterial blood circulation and yet it represents the control of the smaller arterial circulation throughout the entire body, as well as and especially through the rest of the cerebro-spinal nervous system.

(4) Along the side of the spine, in relation to the cord, through the spinal nerves and in relation to the column, through the transverse processes and the heads of the ribs, we find the lateral ganglia forming the sympathetic chain of distribution. The relation between these ganglia and the spine on the one side and the organs of the body on the other side is through the articulation of the head of the rib in its relation to the transverse processes and the ligamentous articulation of the transverse processes in relation to one another. Hence, the mobility of these articulations is really the determining factor in the distribution of the nerve impulses that regulate the sympathetic (visceral organism) life, that is, co-ordination. This is the reason why it is of so much importance that the ribs should be in proper relation to the vertebrae, and that the ribs and vertebrae should articulate normally. The rigidity of the articulations represents an obstruction to the sympathetic nervous life, or an irritation to the cerebro-spinal life.

The difference between the activities of the cerebro-spinal vitality and the sympathetic vitality is to be traced to this fact, that the cerebro-spinal is inhibitory in its nature all the way through, for example, the pneumogastric nerve has only one function wherever it is distributed. Whenever it seems that the pneumogastric nerve has different functions it is because of its anastomoses with some other nerve or nerve system, for example, the pneumogastric nerve is a sensory nerve with an inhibitory function, but it anastomoses with:

(a) The fifth cranial nerve through which it also gets a motor function; (b) the 11th cranial nerve and takes on a motor function; (c) the seventh cranial nerve through which it takes on a new sensory function; (d) the sympathetic system: (a) at the superior cervical ganglion, in the head, face and mouth, becoming accelerator to the heart, a complex viscerovital function. Here the 10th cranial stimulated the sympathetic function. (b) At the fourth and fifth dorsal sympathetic ganglion, where we have a visceromotor rhythmic function.

The cerebro-spinal nerves are always inhibitory, the sympathetics accelerator, but the predominant function may be over-borne. If there is

a variation from this it is due to anastomoses with other nerves or nerve systems. In connection with disease the disturbance may take place either on the cerebro-spinal or the sympathetic side, for example, a function may be too much checked or over-excited. In the one case the irritant affects the cerebro-spinal system, in the other case the sympathetic system. For example, the heart field, that is, (1) heart, (2) lungs, (3) circulation, is kept in a normal state by the co-ordinating play:

(a) of the pneumogastric nerve system, including the 10th cranial, 11th cranial, etc, depressor nerve, with all its anastomoses, and

(b) its anastomosis with the sympathetic nerve system and the other cranial nerves, both sets of nerves terminating in the intrinsic ganglia of the heart. If the sympathetic side is irritated the heart will be accelerated; if the cerebro-spinal side is irritated the heart will be depressed. To restore the heart to the normal we must treat both sides of the nervous system. Therefore, ultimate play of the heart is co-ordination: (1) The weaker side; (2) the stronger side (3) the best method of co-ordinating in a general way is to articulate the spine in the area representing the real heart centers, that is, the third, fourth and fifth dorsal field of the vertebrae and ribs and soft tissues.

The voluntary muscles also come in here. In these muscles we have a double nerve supply, the cerebro-spinal representing the motor side of the muscle activity; the sympathetic representing the blood side, and therefore the nutrition of the muscle. Motion and blood circulation and nutrition act and react on each other and if there is any disease or abnormal condition of the muscles it must be rectified by co-ordinating the double nerve supply, the double functioning. For example, flabby muscle is deficient in nutrition, therefore restore it from the sympathetic side; paralyzed muscle is deficient on the motor side, therefore restore it from the cerebro-spinal side.

Sensation represents the response which the nervous system gives to external or internal stimuli, this response being conveyed along the posterior nerve roots through the sympathetic to the spine and sensorium by means of a sensory nerve. (1) Sensation in origin is purely sensory (2) in its transfer to the spine it anastomoses with the sympathetic system (3) in the distribution of effects resulting from sensation distribution may take place (a) through the sympathetic system- vaso-motor, and (b) or through the cerebro-spinal system- motor. Sensation and sensory stimuli are the extraordinary side of stimulation, nutrition the ordinary side of stimulation. This condition depends on nutrition and the motive condition of the muscle. Sensation may be affected:

(1) Directly from the cerebro-spinal side in connection with the posterior nerve roots or the posterior columns of the spinal cord and through these with the anterior horn cells. (2) From the side of nutrition representing the sympathetic system. (3) From the visceromotive side, cerebro-spinal reflexly affecting the sensory side.

Hence, all these functions- nutrition, circulation, motion, sensation- are interdependent upon each other, co-ordination taking place through the spine. This calls for a general co-ordinating treatment. The best way to apply this treatment is to articulate the spinal vertebrae, and articulate the ribs in relation to the vertebrae. Have the patient on the face, stand at the side of the patient and catch the spinous processes on the opposite side, at the same time catching under



the ribs towards the anterior, pulling the ribs towards you and against the transverse processes, and pulling on the spinous processes at the same time. This gives both a direct and an indirect traction. Use only enough force to move the part of the body you are treating. After treating one side give a similar treatment to the opposite side. This will articulate the entire length of the spine.

In treating any single condition, involving nutrition, sensation or motion, the co-ordination must come from the spine, not the sympathetic system or the brain.

The spinal column and the spinal cord represent, therefore, the objective point in all co-ordinating treatments. The spinal cord for our purposes may be divided into two great longitudinal tracts, the anterior and the posterior. (a) The anterior. This represents the motor, nutritive and trophic functions. Remember that the trophic functions include: (1) nutrition- assimilation; (2) cerebro-spinal nerve force; and (3) cerebro-spinal fluid. This combination of forces, influences and fluids results in assimilation. Without the proper amount of cerebro-spinal fluid the general tissue and muscle tissue will grow coarse instead of refined and normal.

(b) The Posterior. This represents the function of sensation and the normal vitality and irritability (general irritability and irritability) of the muscular system.

The gray matter of these two tracts is connected by interlacing fibers passing from side to side and from one tract to another at different levels, or intercommunication fibers representing the function of co-ordination within the spine. In treatment there are two rules to be laid down bearing on this subject at the present time,

(1) Articulate downward if you are aiming at motion or trophicity, or, if there is any condition of the head that should not be irritated or aggravated, for example, headache, congestion of the head, mental disturbance, etc.

(2) Articulate upward from the coccyx for sensation or nutrition, or in cases where there is weakness in the heart action. Articulate in this case, first, at the coccyx and in the sacral region. To articulate the coccyx and sacrum place the patient on the face. With one arm under the knees of the patient, elevate both limbs upward from the table, with the fingers of the other hand push and pull the coccyx. This will give a direct effect because the coccygeal nerve does not pass through the sympathetic system and like the sacral nerves it gives a dilator effect to all the viscera that are located in that region. In treating the sacrum for articulation give a similar treatment as for the coccyx, except that, with the fingers of one hand you hold the 5th lumbar rigid and give an elevation and rotary movement to the pelvis and lower extremities.

In reaching the sympathetic system at the end of the sympathetic chain in connection with the ganglion *Impar*, rectal dilation is the most important method of treatment: (a) Rectal dilation will give an abdominal effect through stimulating pressure on the sympathetic system in connection with the ganglion *Impar* that lies on the anterior surface of the coccyx. (b) In rectal paralysis defecation can be stimulated by rectal dilation. Rectal paresis is a motor condition and is nearly always secondary to a vasomotor or secretory condition previously existing. (c) In cases of stopped heart or respiration, articulation at the coccyx and rectal dilatation represents the strongest stimulative treat-

ment that can be given because the stimulus passes up along the entire chain of the sympathetics through the visceral field, before it reaches the heart or lungs, and therefore we get an effect on the three local brains which stimulate simultaneous activity in all the visceral organs. (d) In treating for sensory conditions, treat upward and begin with the the coccyx because this makes the sympathetic system act and react upon sensation, resulting in a sensory response entirely in harmony with the vital processes.

The theory of osteopathic treatment differentiates the osteopathic system: 1st: From massage. Massage, as a system, is based on the principle that to rub, pound or knead the soft tissues increases their activity and, as a result of this, that these tissues will grow (not develop). The reason for this is that the only way to develop any tissue is through or by the nervous system. If this is done then we have growth modified by development of tissue. In the application of the massage principle the result is the growth of tissue that is directly treated, or the opposite checked growth or depreciation of tissue; but this means at the expense of some other tissue.

The application of this principle in the Osteopathic field is that while some forms of massage are of service to assist in the development of surface tissues, massage in any form must not be given in the nervous diseases or in any cases where there is any lack of mental functioning, at least, until control has been established from the cerebro-spinal side.

2nd: Osteopathy is to be distinguished from medical gymnastics Swedish movement, physical culture and the different movement cures. These are based on the principle that movements will remove congestion, palliate or alleviate pain, stimulate organic functions and help to develop co-ordination in the functional activities of the organism. This means that gymnastics represents a part of the field of active movements, provided these movements are applied (a) systematically; (b) in conforming to the physiological requirements of the body organism, and (c) as means to an end, namely, adjustment.

The reason why medical gymnastics and massage are not generally applied systematically is because neither of them is based on a special diagnosis but the treatments are given in a general way to promote some functional process or to stimulate the entire system. Both of these fall under the head of osteopathic treatments when they are brought in relation to the special diagnosis which belongs to the osteopathic system. This means that no system is entitled to recognition as an independent system unless it has: (a) a distinctive therapeutic system; (b) that therapeutic system must be based on a specific etiology, that is, a particular type of cause or causes leading up to the special forms of disease. Massage and medical gymnastics fail in both of these particulars because they are used simply as an accessory means to promote some therapeutic end or purpose in one of the systems of practice, or to help some other agent. Massage and gymnastics are used by osteopathy in giving a general treatment. There are only three conditions under which the osteopathic principle allows a general treatment:

(a) to help to remove or to palliate pain. In most cases this applies only to superficial pain. (b) to help to distribute the blood more equably and more generally over the system. This applies chiefly to the superficial circulation. (c) to equalize the distribution of nerve force. This applies chiefly to the peripheral nerve distribution.

THE OSTEOPATHIC SYSTEM DIFFERENTIATED FROM  
MEDICAL SYSTEMS.

The Hahnemannian Advocate, Chicago, March 15th, 1901, in an article by Dr. George L. Knapp, says: "There are today two important schools of medicine, one, the older and larger, claims for its members the title of "regular" physicians, and calls its schools simply "medical" colleges. The other, and smaller division, calls its schools and graduates by a distinctive name, indicating a given system of therapeutics. For more than a hundred years there has been much strife between these two schools— one fighting for domination, the other for existence."

The writer goes on to point out that there is a radical difference of principles which justifies the existence of separate schools. "As to what that difference is there is less unity of opinion. It cannot be in anatomy, physiology or any of the elemental sciences of medicine. They are the same in both schools. Surgery when it comes to surgery is also the same. The difference lies in the domain of therapeutics; in the application of medicines to the cure of disease." Dr. Wood tells us that "experience in medicine has been a blind leader of the blind," and "the history of medicine is a history of men groping in the darkness, finding seeming gems of truth, one after another, only in a few minutes to cast them back into the vast heap of forgotten baubles that had in their day been also mistaken for verities." "What", he asks, "has clinical therapeutics established permanently? Scarcely anything beyond primary facts; that quinine will arrest an intermittent; that salts will purge, and that opium will quiet pain and lull to sleep." That was thirty years ago. Since Dr. Wood's day "clinical therapeutics" has added a few "primary facts". It has learned that bathing is less harmful than drugging, that the salicylates will suppress rheumatism (sometimes), and that the various coal-tar derivatives will enable a man to die with a normal temperature. Aside from this the practice of "regular" medicine has not materially advanced. It has changed, of course. The vast heap of forgotten baubles is a little vaster and the harmonious "regulars" are quarreling over serum therapy instead of over something else. It has always been the prized prerogative of "regular" medicine to dance attendance on the latest fad."

This last statement is hardly correct. M. R. Brown, M. D., in the Chicago Sunday Tribune, says, "As instances of real facts I would mention Osteopathy. \* \* It owes its recent origin to an obscure physician in western Missouri. It had an earlier origin from Borelli who flourished in Naples in the early part of the seventeenth century. It is a mechanical theory of medicine, and like massage, of which it has an improved form it has or may have a limited use. To maintain it as an exclusive system is illogical, is a substitution of a part for the whole and the present pursuit of it is clearly fadism." What is a fad? "If by fads in medicine we are to understand (as the definition of the word implies) a trivial fancy adopted and ~~xxxxxxxxxx~~ pursued for a time with irrational zeal, or a matter, whether important or unimportant, imperfectly understood and taken up and urged with more zeal than sense, we will find less fads in medicine than in any of the other sciences. In fact medicine, as I understand it in its strict sense, is free from fads. Experiments carried on with almost irrational zeal by some enthusiasts in medicine have not been done as a fancy but as a search after knowledge and as a means of benefitting mankind, and therefore cannot be rightly considered a fadism." So says Dr. Brown. But his last statement applies

to the osteopathic principle for it represents "a search for knowledge" and "a means of benefitting mankind", in fact has benefitted mankind in multitudes of cases. He correctly says "it is a mechanical theory of medicine," if by this we mean mechanico-physiologic. But hasn't the regular school maintained the giving of drugs as an exclusive system, and is this not illogical on their part?

Putzel, a regular authority of high repute, in *Functional Nervous Diseases*, p. 39, says, "The medicinal treatment of chorea is extremely unsatisfactory. Gray and Tuckwell found that the average duration of 38 cases treated on the expectant plan, was nine weeks and six days. The average duration when treated was arsenic in constantly increasing doses, according to Beghie's plan, is from ten to eleven weeks." Time required to get rid of the arsenic not stated. It is interesting to note that after making this observation the author tells us that his usual plan is to put the patient on three to five drop doses of Fowler's Solution, three times per day, until some of the toxic effects become evident. In the same work, page 183, he says: "Very little can be done in chronic neuritis in the way of material medication. The only internal remedies that I have ever employed are iodide of potassium and fluid extract of ergot, either separately or combined. I am unable to make any positive statement with regard to the efficacy of these drugs."

In another class of diseases, Dr. Jas. C. Wilson says: "No medicine or method of treatment by which enteric fever can be arrested is at present known. Many different methods of treatment have been advocated and innumerable drugs have been lauded as exercising special favorable influence over the course of the disease. Blood-letting, emetics, laxatives, various astringents, turpentine have at different times been regarded as useful or necessary in the treatment of this disease. Most of them have no longer even an historical interest." To this I need only add that the Johns Hopkins hospital uses no drugs in the treatment of typhoid fever and yet has a larger percentage of cures than any other old school hospital in the country." (Knapp).

The public know too well what the medical profession has done and failed to do. We have contended that the medical profession have done what they could and have done it in a self-sacrificing spirit as the curators of the health of the people. But when they set themselves in opposition to the developments of modern research and demonstration in the field of the healing art, they no longer act as custodians of public and individual health, but as members of a close and jealous corporation. The world has seen what the osteopathic system can do and the people believe in it accordingly. Recently we heard of a case which will illustrate the incredulous attitude of many physicians. An osteopath was called in to a case which had baffled the physicians' skill, by the physician himself, at the urgent request of the family. When the patient was cured and raised up out of bed by a single treatment in the presence of the physician, the physician then declared it to be a case of hypochondriasis. Why? Because he would not admit the limitations of his own system and credit the efficacy of another system, although the demonstration was made before his eyes.

"According to some of the most eminent writers, among them the French Marey, the function is determined by the structure of the form. From an anatomical standpoint this is correct, but we say also the form or structure is determined by the function." "The comparison

between ordinary machines and animated motive powers will not have been made in vain, if it has shown that strict relations exist between the form of the organs and the character of their functions; that this correspondence is regulated by the ordinary laws of mechanics, so that when we see the muscular and bony structure of an animal, we may deduce from their form all the characters of the functions which they possess." Page 69.

Later, in confirmation of this, he writes, "The short and pithy formula of Mons. L. Guerin 'function makes the organ' expressed in a general manner the modifying action of function. It must be shown how the bones, the articulations, the muscles are modified in various ways by the effect of function of different kinds; how the digestive apparatus, yielding to varying kinds of foods, passes through transformations which adapt it to new conditions; how a change effected in the circulatory function produces in the vascular system certain anatomical modifications under the influence of the function itself are accompanied by anatomical modifications in the apparatus." Page 84.

"No one denies at the present day that the bony system is perfectly yielding in its character. These organs which are so compact and so hard in the dead skeleton are on the contrary essentially capable of being modified while the organism is living. If we exert upon a bone a pressure or a tension, however slight it may be, yet if prolonged for a considerable time, it can produce the strangest changes of form; the bone is like soft wax which yields to all external forces; and we may say of the skeleton, reversing the proposition to which we have just alluded that it is completely under the influence of the other organs, and that its form is that which the soft parts with which it is surrounded permit it to assume." Page 87.

In confirmation of this I quote from Dr. Heather Bigg's work on "Spinal Curvature". Dr. Bigg was gold medallist of University College London. He writes "The rotation of the vertebrae (or osseous segments of the spine), the spreading of the ribs on one side, the rising of the shoulder on the same side, and the establishment of secondary curves—all these follow one after the other as a simple consequence of the disposition the spine evinces to curve laterally. Page 47.

What effect has this on the functions? "There are certain disorders of the vital organs of the body which are found to accompany spinal curvature and which are in their origin purely mechanical. For, as the spine, becoming deformed, loses its shape, so do the guardian cases of the vital organs (namely, the nervous center case, the thorax and the abdomen) lose theirs also, and getting altered, cramp, compress or dislocate the vital organs that are contained in them. Now the disorders of the said organs, which are the natural consequences of such changes, are, since their origin is mechanical, amenable also to mechanical treatment, that is to say, as the body is restored by mechanical means towards its natural form, so the vital organ cases will resume their natural shape, and the organs themselves which suffered compression or dislocation will cease to be compressed or dislocated and will cease any longer to be disordered." Page 102-3.

Here we have exactly, without any need for explanation or application, the statement of the relation between form and function and vice versa, and the applicability of mechanical therapeutics in correcting the condition. This is osteopathy pure and simple.

Another point called in question is the displacement or dis-

location of the spinal vertebrae. We find displacements, luxations of the vertebrae. "Dislocation of the spine- Although this accident is generally a complication of fracture there are many cases recorded of pure dislocation. The injury most frequently occurs in the cervical region, owing to the smaller size of the vertebrae and their less intimate apposition. The fifth cervical seems to be the most liable to displacement. In the dorsal region, the 12th segment, is the one most frequently displaced. In the lumbar region the accident is very rare, the dislocation is generally bilateral, but a number of unilateral luxations are recorded. The causes of the injury are forced flexion or extension, extreme lateral motion or rotation." Clinical Text Book of Surgical Diagnosis, by J. F. McDonald, M. D. Prof. of Surgery, Hamline University, Minneapolis, pp/820-21.

This is repeated almost verbatim in the American Text Book of Surgery, pp. 573-74, 2nd edition, by W. W. Keen, M. D. and J. W. White, M. D. These are quotations from medical men of high standing and state what we as Osteopaths find every day in our work. No Osteopath could state them more clearly. It is our fundamental position, that we build our system on anatomical and physiological facts, our lesions being malalignments recognized by the men referred to. \* \* We saw recently three cases of spinal dislocation in Cook County Hospital in the dorso-lumbar region, one of several years standing, in which physiological changes of functioning followed the lesion just such as osteopathy claims.

In Erichsen's "Science and Art of Surgery" the author declares that "dislocation of any one of the five cervical vertebrae may occur. The third vertebra is least frequently dislocated; the fifth is more commonly displaced. These injuries are usually associated with fracture; sometimes, though rarely, they happen without this complication. In these dislocations the displaced bone carries with it the whole of that portion of the vertebral column which is above it."

The ignorance of Osteopathy on the part of the critics is wonderful. In the N. Y. Lancet we find the following: "What is the kernel of therapeutic truth in Osteopathy? Simply that the more or less judicious movements of diseased parts cure such parts. This fact is demonstrated by the position of the Ling system in Swedish medicine, by the cures wrought among us by the imported masseurs and their imitative rubbers, and by the great popularity of Osteopathy among the laity. What is the harm of it? The harm of it is its indiscriminate application as a cure-all-- a system of cure-- by its enthusiastic but poorly educated leaders. What is the profession doing to reclaim this lost territory to its own? With us the little done is left to the untrained or the imported. Nothing is done to popularize the method and this remedy of undoubted therapeutic value is wholly neglected in our smaller communities. The time is ripe for a well-offended and well equipped school of massage and physical culture."

We are glad that recognition is made of the therapeutic value of the method- although the insinuation seems to be made that it is a system of cure- that, it is not. To identify Osteopathy and massage, displays ignorance. Osteopathy is no more like massage than massage is like medicine.

The writer seems to think that the profession should reclaim lost territory. As long as they do so by officering massage and physical culture schools we do not object. Osteopathy cannot suffer from this, because its system can't be stolen by the ignoramus nor re-duplicated by the movement fiend, even though he be a well educated medical

leader. We respect the Ling system and honor the masseur, because they represent rational treatment; but osteopathic philosophy was dug from a deeper stratum of human nature than either and it has far reaching principles of which massage and movement were simply the shadows.

The writer seems to think that movement is the all and all of Osteopathy. Perhaps it may be a revelation if we state that there are cases in osteopathic practice when movement is contra-indicated. In tuberculosis we have such a case, where movement is forbidden and absolute rest is the principle. It is true that mobility is the principle of vitality and to this extent the osteopathic principle is founded upon the life fact of movement (mobility). Beyond this movement is not the cure-all.

We are pleased to have confirmation of this in the Literary Notes of the Kneipp Water Cure for October, 1901. In a friendly review it is said, "The science of Osteopathy is unfortunately far too little appreciated as yet. Most people seem to imagine that an Osteopath is only a superior kind of masseur. Well, we would only request all those people who have no better knowledge to read attentively this article ~~xxxxxxxxxxxxxxxxxxxx~~ and they will then be able to appreciate Osteopathy to its full and complete extent."

Osteopathy is not movement per se but movement for a specific purpose, to adjust where lack of adjustment exists, to relax in contracture, to contract in relaxation, to tone up and build up in non trophic and debilitated conditions. All such writers are ignorant of the fact, that the real foundation of Osteopathy is in specific diagnosis with a distinctive etiology, and that where manipulation is applied in a general way without such definite diagnostic etiology, the manipulation is not osteopathic but blind massage. Medical men generally got the idea that the osteopathic system could be an adjunct of medicine or surgery, added on at the tail of the old symptomatology and physical diagnosis. Such is impossible because the physical diagnosis must be osteopathic, the symptoms must be osteopathically brought out, otherwise the manipulating cannot be true Osteopathy.

### L E S I O N S .

Lesion, as defined before, includes any change from the normal in the structural elements, composition principles, or environmental relations. Such a lesion may be primary as an initial cause, or an exciting cause, or it may represent a conditioning cause. In the first type the lesion is causative of all accompanying and subsequent changes. In the second type lesions are sequelae of previous conditions of disease and hence these lesions are (a) evidences of the previous conditions, and (b) may be causes of subsequent conditions. In the third type lesions are established changes that maintain the abnormal position, relation and functioning of certain organs of the body. Such lesions it is our duty to find and when they are located it is also our duty, (a) to give them proper place in the field of causation, namely, causa causans, evidence or sustaining condition; (b) to explain the significance of these lesions in relation to the particular conditions found in the patient; and (c) to explain how these lesions may be removed so as to restore normal conditions in the patient's life. Plan to be followed

in correction- principle- secondary lesions should be looked for and corrected first, except in one case,-a traumatic lesion.

Ossseous lesions usually indicate, and are present, in the chronic diseases. They may indicate acute forms at particular times when associated with sensitiveness, tenderness or pain. Muscular lesions usually indicate the acute diseases or the acute manifestations of a chronic condition. This applies to the diathesis. Ossseous lesions may be found in any region corresponding with the function of the organ that is involved. The lesion cutting off the sensory, motor or vaso-motor impulses. These lesions may produce: (a) diseases or malnutritional conditions (functional) of tissues or organs; (b) the lesion itself may result from some interruption of the functional activity. These lesions are generally located by tenderness, pain, hot or cold spots along the spine. These represent the physical signs of disease from the osteopathic standpoint,- physical signs of the inability of nature to accommodate to new conditions or to compensate for changed conditions,- representing relaxation or contraction of the muscles and other soft tissues, indicating lack of adjustment of tissues.

In the examination of a patient to find out what lesions are present:

(1st) Have the patient sit up straight in the easy posture for the patient. Then gently run the fingers down along the spine, taking in all the vertebrae from the occiput to the coccyx, palpating for tender, sore or painful spots. This is the first superficial examination.

(2nd) Apply gentle pressure with the fingers at each vertebral segment of the spine for deep sensitiveness and deep tenderness.

(3rd) Apply deep and firm pressure between the spinous processes, between the heads of the ribs and the bodies of the vertebrae and at the point of junction of the ribs with the transverse processes.

(4th) In order to find out if there is any rotation of the ribs make the patient fold the arms across the chest. This will tighten the muscles and throw the ribs into prominence, then apply pressure with your fingers at the heads of the ribs, pulling the fingers outward from the head of the rib toward the angle of the rib. Note whether there is any deviation in the rib and any tenderness on pressure. If the rib is normal the flat surface will be palpated toward the sternal or abdominal end of the rib. If the rib is abnormal you can palpate what is called the knife edge of the rib (sharp edge). These lesions indicate:

(1) Points at which there is a disturbance in the structure or functional activity or something that is abnormal in the structure or relations. (2) Points at which the treatment is to be applied. (3) Rib lesions are important because the heads of the ribs articulate in relation to the segments of the vertebrae and affect the nerve supply.

A lesion indicates the lack of adjustment. The physical signs indicated by a lesion are:

#### I. T E N D E R N E S S .

(1) Tenderness right over the tips of the spinous processes indicates an anterior condition of the vertebra and calls for the re-adjustment by moving the vertebra from anterior to posterior, This is best done by articulating the vertebrae above and below the one involved. The reason for this is that correction is not a question of physical force; we must take account of and use the vital relations of the structure that is out of place to the other structures contiguous in the



effort to get it back into place and the best way to do this is by articulation.

Everything can be articulated that can be moved and every part of the body ought to be movable. The best way to get at any single vertebra to move it is to move its neighbor and this gives adjustment between the vertebra involved and its neighbor.

(2) Tenderness above the spinous processes indicates a lateral condition of the vertebra that is involved. In correcting this articulatory treatment is called for just as in number one.

(3) Tenderness below a spinous process of any particular vertebra indicates a change in the position of the body of the vertebra that is involved, for example, this is what we find in many chronic conditions. To correct in this case apply: (a) extension; (b) free rotation of the vertebrae in the region of the lesion; and (c) articulation.

(4) Tenderness at the angle of the rib indicates an upward or downward movement or rotation of the rib or rotation of the head of the rib. The treatment called for in this case is the rotation of the rib in the opposite direction, for example, if the rib lesion is one of rotation downward the patient may be placed in one of two positions: (a) the patient sitting up, place the thumb at the head of the rib and with the other hand elevate the arm of the patient on the same side, pulling up or pushing down on the rib at the same time; (b) The patient on the back; place the fingers of one hand at the angle of the rib, place the other hand over the sternal end of the rib with the arm of the patient pulled tightly in extension up over his head, then push between the two hands at the sternal end of the rib and the angle of the rib. These represent the four points of tenderness brought out in relation to the examination of the spine.

## II. SORENESS.

This is a condition of the muscles and is found in the muscles along the spine, indicating muscular contracture (this compared with tetanus in which we get contraction). This is a reflex from some organ or deep part of the body corresponding with the center (either cerebrospinal or sympathetic). The indicates for treatment in this case are: (a) Relaxation of the muscles by strong inhibitory treatment. (b) By gentle kneading treatment to relieve the local congestion and contraction and to free the organ or deep tissue that is involved. (c) By extension applied to the spine with patient on face or back, to correlate activities of spinous muscles and to relieve congestion of the spinal cord and the spinous muscles.

Each organ and tissue has its own nerve supply. These nerves being the pathway from organ to organ and from organ to center and vice versa. If these organs are normal the pathways are always busy. If any particular part of the body is in a state of disease, disorder or state of irritation one of two things may happen: (a) The pathway may be closed, preventing the passing of impulses (here we may have a temporary paralysis). (b) The pathway may be carrying too many impulses and therefore over-excited and as a result is in a state of irritation, for example, if a bone or tumor presses on a nerve or a contracted muscles impinges on a nerve the nerve will be in a state of irritation. In giving treatment to correct this condition the impulses produced by treatment tend to pass along the pathway of least resistance, that is, open pathway; hence, if you detect a lesion the irritation may be removed from the nerve and the excess of impulses distributed along other nerves relieving the state of irritation. Thus the treatment tends towards co-ordination.

PRINCIPLES UNDERLYING OSTEOPATHIC TREATMENT.

Osteopathic treatment based on the fact that treatment is to assist nature towards the normal. As long as vitality exists there is the tendency towards the normal. The aim of the treatment is to help this tendency to re-establish the natural condition. This means that the object of treatment is not to cut off anything or to obstruct or to kill anything, as is frequently the theory in medicine, but it is to assist the weakened powers of nature to regain its normal strength. This tendency to the normal we find: (a) In the body as a whole, in connection with the organic or embryonal life developed into maturity. (b) In the separate parts of the organism in connection with the irritability of the particular tissues and organs of the body.

Physiology teaches us that each tissue and organ has its own irritability. This irritability is the basis of the local tendency towards the normal. Physiologically this tendency on the two sides (a and b) manifests itself through the vitality and this physiological vitality always comes to the assistance of the weakest part of the body. For example, tramp on a nail with your foot; result, the injured part has a localized inflammation, which is an increase: (a) of local fluids; and (b) of local temperature. The fluid is brought to the surface by the body vitality to assist in the body repair. This process of repair consists of (a) the driving out of waste or lebris or broken down accumulations. (b) Cleansing the local tissue to preserve the local part from poisoning. (c) To build up the nutritive condition of the affected part.

This means that inflammation is physiological, not a pathological condition. The lesion existing in this case is traumatism in connection with the irritation that causes the vitality to come to the aid of the injured part. Different schools of medicine treat conditions of diseases from different standpoints. All of them, either directly or indirectly aim at using the vitality as an ultimate curative means. The intermediate means used differ from one another in the different schools.

THE ALLOPATHIC SCHOOL uses a method of treatment, probably best expressed by the word COUNTERACTION, that is, a condition of disease, or irritation (these are synonyms, although they express different conditions) is met by a counter condition, disease or irritation. This means that a drug condition (therapeutically) is developed within the system along physiological lines designed to meet and counteract the condition, disease or irritation that represents a pathological condition of the body or its tissues. For example, the physiological condition (produced therapeutically by drugs) is placed over against the pathological condition with the object of allowing the physiological condition to overcome or overbear the pathological condition.

This is what is meant by speaking of a physiological medium, that is, the use of a substance to create a physiological condition to overcome a pathological condition. For example, take some of the very powerful disease conditions associated with the system, such as tuberculosis or syphilis, these represent strong toxic conditions found in the system. The allopathic system attempts to counteract these by the so-called specifics, for example, anti-tubercular remedies; the syphilitic condition, by the specific mercurial treatment, etc. Mercury in this latter case creates a new physiological condition under control or in suppression.

THE HOMEOPATHIC SCHOOL uses a method sometimes called the "Method of Similars", according to which when a condition, disease or irritation exists in the body a potentialized substance representing the potential force "vibration" of some specific substance is introduced into the system with the object of establishing along physiological lines a condition similar to the condition of the disease, the similarity is marked by symptoms. In other words, the disease is expressed by certain symptoms on the pathological side and these symptoms are met by a newly created physiological condition (by the therapeutic action of the potentialized substances) as nearly similar as possible to the pathological condition. According to this method the normal vitality is duplicated by the potential force of the substance with the object of influencing the vitality to as to restore the disturbed condition of the body to normal.

THE ECLECTIC SCHOOL applies the method of specific medication according to which certain medical agents, either crude or in the potential form have an affinity to certain tissues or organs and hence these substances either in crude or potential form have the power of correcting or removing diseases that involve the tissues or organs. That is, the Eclectic School is either Allopathic or Homeopathic, or both, but as a school it differs from these others in attempting to establish the new condition, or to combat by substances which have a special affinity for the special condition involved.

THE PHYSIO-MEDICAL SCHOOL uses the method of what is called "Sanative Healing", according to which

(a) Nothing that is poisonous is to be used in the field of medicine. It is interesting to know how a poison is tested. A poison, according to this system of therapeutics, is any substance, the smallest amount of which will destroy the life of the blood, that is, will kill the white blood corpuscles. This means that they include in poisons, not only the active poisons but any substance which has a strong enough toxic action to destroy life. (b) Vegetable agents that are tested and found to be non-poisonous are used for the purpose of:

(1) Cleansing the system on the principle of depuration;  
 (2) relaxing contracted and contracting relaxed conditions of the tissues or organs so as to restore them to a tonic state; (3) overcoming the torpid condition of the organs and tissues by stimulating peristaltic and rhythmic activities; (4) stirring up the centers of vitality by means of substances (non-poisonous\* so as to compel the vital force to restore perfect life to the organism, to its tissues and organs. The Physio-Medical School is Allopathic in its method but limits the media to non-poisonous substances.

THE OSTEOPATHIC SCHOOL uses a method (1) that is based upon the self-sufficiency of the organism in vitality, materials and active processes. (2) Regarding the organism as built upon a definite structural foundation and constructed on a definite plan of architecture, the adjustment of the body to itself as a whole and to its parts lays the foundation for perfect life, which is HEALTH. (3) Within the organism is found all the necessary apparatus for life and for its regeneration and recuperation. (4) Within the organism are found all the necessary proximate principles that are required for life for its regeneration and recuperation, provided the raw materials of food, water and air are supplied to the organism. These are supplied (a) in the dietetic field, and (b) in the field of respiration.

(5) Pathological conditions always originate in connection with disturbances in the vital distribution of forces or fluids by the structural or functional activity of the tissues or organs. In other words, we have a general condition depending upon a particular and specific condition, for example, inflammation represents a symptom or sign of disturbed circulation or disturbed nerve force, the disturbance depending upon or being caused by some primary condition that we call a lesion. According to this, inflammation is a sign of disturbed adjustment, the result being a disturbed distribution. That is, it is a symptom of (a) dying or (b) death condition of some particular tissue or organ of the body, caused by an impediment or obstruction to vitality.

The primary disturbance or cause of the variation from normal is an interference with the vitality or the vital activities either of the organism or of the particular tissue or organ. This disturbance prevents the general vitality from controlling the particular part that is affected, hence,

(6) From the osteopathic standpoint, the restoration to normal by treatment must take place from the standpoint of vitality, the method of this restoration being the adjustment of the parts affected to each other and the body, as a whole.

Another illustration is the coagulation of the blood. Here we have a physiological, not a pathological process, representing an attempt on the part of nature to get rid of some foreign substance or to prevent the loss of blood from some particular part of the body. In getting rid of a foreign substance when the blood deals with it, it coagulates a mass of its own fluid around the foreign substance so that it will not be free in the circulation. In that way it will be driven against some portion of the blood vessel wall to remain until it can be eliminated, or else it will be driven into the blood to be disintegrated and absorbed.

Coagulation may also take place where there is a puncture or a slight rupture in the blood vessel wall. Here the coagulation represents local death, this particular portion of the vital fluid dying in order to preserve, vicariously, the body life of the rest of the blood. If the coagulated blood dies the vital force of the body hands over the dead substances to certain chemical changes so as to allow these dead parts to be eliminated and to prevent the entire blood being intoxicated (poisoned); apoplectic changes, for example, represent this condition. In apoplexy there is the rupture of a blood vessel in the brain the blood coagulating on the surface of the brain, preventing the rest of the blood becoming poisoned by becoming a blood clot. It may or may not be fatal. The difference between the two is that if the vitality of the patient is strong enough to work the clot off by absorption the patient will survive. In some cases we have cardiac apoplexy similar to the brain apoplexy, except that it is located in the heart.

Another illustration is poisoning. This is treated by the body in a similar way, that is, the body has the power within itself to destroy poisons up to the limit of its capacity. This capacity is based on the fact that there are certain glands of the body which have no other function than to prevent the body being poisoned by preventing the poison from reaching the centers of life. Giving poison to the system under any circumstances lowers the vitality of the body and consequently lessens the resisting power of the body. There are three glands which perform this function for the three centers of the body:

(a) THE PINEAL GLAND, which is a part of the pituitary body. It is located in the head cavity at the base of the brain and is a poison destroyer for the head.

(b) THE THYROID GLANDS, located in the neck act as poison destroyers for the thoracic cavity.

(c) THE SUPRA-RENAL or ADRENAL BODIES, located in relation to the kidneys act as poison destroyers for the abdominal and pelvic cavities.

For example, goitre represents a constitutional state of intoxication by poisons, the thyroid gland losing its function, or rather its power to discharge its function (inhibition by excessive dilation) by the excessive storage of intoxicated matter. That material in its simple form is mucin, but the mucin is toxinated. In goitre this substance is found in the gland; when the gland is hard there is a solid mass of mucin. This mucous that accumulates comes from the mucous glands of the mouth, throat and stomach.

Another illustration is Addison's Disease. Here the skin becomes bronzed, the supra-renal glands losing their function or their power to discharge their function, similar to the thyroid glands in goitre.

An illustration in connection with the pineal gland is found in what is called Lumpy Jaw (Actinomycosis or Elephantiasis) of the jaws or bones of the face. Here there is enlargement of the bones of the face, the accumulation taking place here outside of the cranial cavity of substances that should be eliminated by the pineal gland itself, the pineal gland being filled up with mucin so that it cannot discharge its function.

Among the general treatments we called for we note the following. These treatments are always necessary to some other line of treatment:

I. A treatment to control the general circulation. This will hereafter be spoken of as the general circulation treatment. This general circulation is to be controlled in four different ways:

(a) through the great vaso-motor center in the medulla (constrictor and tonic). The treatment is to be given in the upper cervical region. Hence, we say that the osteopathic center for general circulation is located in the region of the superior cervical ganglion, that is, in relation to the second, third and fourth cervical vertebrae. This treatment affecting the vaso-motor function of general circulation:

1st: affects the atlas and its nerve distribution; (2nd: in connection with the upper five posterior cervical nerves that send some of their fibers of distribution to the medulla and basal ganglia; 3rd: treatment applied between the suboccipital region and the upper end of the superior cervical ganglia reaches the nerves that pass upward from the superior cervical ganglion into the cranium.

(b) In connection with the accelerators to the heart: (1st) on the cerebro-spinal side at the third and fourth dorsal; (2nd) on the sympathetic side at the fifth and sixth cervical. This co-ordinates the accelerator function.

(c) Through the splanchnic area from the sixth to the twelfth dorsal, inclusive. Here we get: (1st) the vaso-motor nerve supply to the mesenteric capillaries; (2nd) the visceromotor nerve supply to the walls of the viscera. The former is more important because it represents the nerve distribution to the minute capillaries, to the mesenteric circulation.

(d) In connection with the superficial body circulation at the fourth and fifth dorsal. Here we get control of the blood circulation (1st) through the blood pressure; and (2nd) through the blood flow, es-

pecially by accelerating the peripheral circulation. Here we specify blood pressure and blood flow, because these are two entirely different factors. The blood pressure is the force within the blood vessel wall; the force is dependent largely on the heart force. Blood flow represents the rate at which the blood travels through the blood vessel system, modified as it always is, by the volume of the blood (heart cavity volume).

II. GENERAL RESPIRATION TREATMENT. Respiration is controlled in three ways:

(a) Through the circulation; (b) through the vaso-motor nerve supply to the lungs. The vaso-motors are located from the 2nd to the 7th dorsal on both sides of the spine. (c) In connection with the ribs especially the first five. The treatment to be given here is the treatment of raise the ribs. Begin at the third rib, raising the third, fourth and fifth ribs, then raising the first, second and third together. Place the patient on the back; place the fingers of one hand over the ribs at the back of the patient, with the other hand catch the patient by the arm on the same side and pull the arm strongly above the head, then rotate the arm downward and around in a circle to the side of the patient. After this raise the arm of the patient above his head and leave it lying there, then apply pressure between the sternal end of the rib and the head of the rib. In raising the first, second and third ribs stand at the head of the patient, pull up the two arms over the patient's head and allow them to rest there, then insert the fingers between the second and third ribs, anterior, and pull upward while the patient is inspiring and hold while the patient is expiring air. Continue this while the patient is instructed to breathe more deeply at each inspiration. In this way you will get a strong leverage on the ribs and thus you will be able to raise the ribs quickly and maintain them in an elevated condition.

III. THE TREATMENT FOR GENERAL NUTRITION. Nutrition is controlled:

(a) Through the circulatory and respiratory systems, so as to increase the amount of blood and oxygen. (b) By strong stimulation of the stomach, the small intestines and the liver at the centers that correspond with these organs in the spine. (c) Stimulate the nutrition in connection with the sympathetic system, the special center for nutrition being the 6th to 10th dorsal. This represents the center for nutrition for the entire body. This center is of great importance:

(1st) In dealing with conditions that affect the nutrition of the brain; and (2nd) in cases where the patient is becoming either emaciated or obese. The treatment from the 6th to 10th dorsal is an articulation of the vertebrae in relation to the ribs.

In all cases where general circulation, general expiration and general nutritive treatment is given, the correction of lesions to be looked for in any of the areas noted is to be specifically attended to.

There are two types of obesity: (1) Nutritive-lesions sixth to tenth dorsal; (2) secretory in connection with the receptaculum chyli.

In connection with lesions and the correction or removal of the lesions there is both action and reaction. (a) The removal of obstruction and irritation is the primary action. (b) The reaction is the stimulation in some way of the nerve energy. Hence, the method from the standpoint of these lesions that we have been discussing is what we might call specific action or exact action, and energetic or life-giving reaction. That is the effect that is aimed at here is the reaction, not the action, the reaction bring in the direction of the establishment of the normal adjustment. One of the most important points in this field in connection with the motor nerve supply is the subject of displacements, osseous displacements, and these osseous displacements involve the vertebrae in the different regions of the spinal cord and column.

In connection with the sensory nerve supply we found that pain was the most characteristic symptomatic condition. In connection with the disturbance of the motor side of the nerve apparatus, functional disturbance is the most important evidence that we have of the lesions, and in some cases it is difficult to say whether the lesion is primary or the functional disturbance is primary and that the lesion, at least in connection with the vertebrae is secondary to the functional disturbance, so that in the majority of cases those lesions that we will speak of are to be regarded as secondary, not necessarily, however, secondary; they may be primary.

We will take up the lesions that are found and the discussion of the subject in regions. First, the cervical region. (a) The cervical vertebrae articulate in relation to one another more horizontally than in any other region of the spine. The direct relation of one vertebra to another is much more marked in the cervical region than it is in any of the other regions of the spinal column. (b) Another point that is of importance in the cervical region is that the articulating surfaces of the vertebrae are convex above and concave below, in that way providing for a field for displacement in the relations of one vertebra to another vertebra.

Taking these two as the fundamental physical principles which are established in the relation of the cervical vertebrae to one another, the vertebrae are so constructed as to represent perfect alignment, that is, the adjustment is so perfect between one vertebra and another that we have free rotation and at the same time free flexion in any direction; that is, in the cervical region of the spinal column. That is not true of any of the other regions of the spinal column. (c) At the same time, there is another principle that requires to be taken account of in the cervical region. These cervical vertebrae are piled one on the top of the other in such a way as to form a continuously constructed pillar on which the head is placed, so that the regular position of the head depends upon the position (1) of the pillar as a whole, and (2) of the pillar constituted by the correlation of the cervical vertebrae each vertebrae being a unit in that pillar. Perfect adjustment of these vertebrae to one another is required in order that the pillar may act as a proper support for the head. (d) In addition to that the unobstructed arterial blood flow through the vertebral arteries to the brain and the free nervous impulses to and from the brain over the cervical nerves and through the cervical plexus is an absolute necessity, in order that the body may be in a normal condition. Why? You will remember embryologically we found that the first part of the spinal cord to be distinctly developed is the cervical region of the spinal cord, and that cervical region maintains throughout the entire adult life the position of media-

tor between the brain part of the nervous system below the cervical region and the rest of the nervous system below the cervical region, in the peripheral parts of the body, so that we may look for a lesion in the cervical region involving any part of the brain or head, or involving any part of the body organism, even down to the lower extremities. The explanation of that we will come to later on.

That does away with the idea that has gained so much prominence in some osteopathic theories, that a definite vertebra is always to be associated with a definite disease. We will find when we come to discuss that subject that a center is not a structural combination but a physiological combination, and that combination may be of cells in the cervical region and of cells in the lumbar region on a physiological basis.

The first vertebra that we meet in the cervical region is perhaps the most important in the body, and that is the ATLAS. This articulates, as we know, with the occipital bone of the cranium, and it differs from the rest of the vertebrae in the spinal column to this extent, that there is no body in that atlas, the body which is developed in the embryonic life being added on to that of the axis to form what is called the odontoid process. This vertebra standing as it does at the head of the spinal column, if it happens to be twisted to the slightest degree may impinge upon the vertebral arteries. These vertebral arteries go in a very tortuous way through the foramina in the transverse process in the atlas, then they pass upward and backward, over the curving lamina of the posterior arch of the atlas; then they pass through the foramen magnum into the cranial cavity, where the vertebral arteries unite together to form what is called in the anatomy the basilar artery. This basilar artery lies along the median line in a little furrow or groove that is formed by the right and the left pons, where the two parts of the pons approximate together and at the point of separation leave a hollow or groove. This basilar artery then passes up in this groove or hollow and is very closely connected with the formation of the circle of Willis, that circle of Willis representing in reality the heart so far as the circulation is concerned in connection with the brain. The circle of Willis has as its special functions, first the function of distributing and equalizing the blood supply to the brain; second, the promotion of equality and the preservation of equality in connection with the pressure of the blood through the brain. The ~~arteries~~ <sup>arteries</sup> of the circle of Willis, therefore, is generally an atlas lesion and the method of correction is rotation, flexion and articulation.

Any impingement, as you will see, on the vertebral arteries which go directly up on either side to the circle of Willis will involve an interference with the circulation of the brain, that is, the circulation of blood in the brain, and this may result in a number of conditions. For example, fainting spells, dizziness, vertigo, drowsiness and a number of other symptoms of that character that depend upon the altered condition of the blood supply to the brain. If the lesion involving impingement becomes more marked, the effects may go reflexly backward to the heart, and may produce as a result of this reflex acceleration of the heart action. What is the general result that we will find? The general result, whether the effect is transmitted directly up into the brain or reflexly down into the systemic circulation, will be to produce a disturbance, or probably to destroy the equilibrium of the blood circulation, and that result will settle down in what is the weakest point of the circulation of the body. In other words, whatever part of the indivi-



dual body represents the point of weakness from the standpoint of the circulation will be the point where this condition will settle down on account of the disturbance of the equilibrium of the blood supply, and the final result will be that that weak point in the body will pass into a state of mal-nutrition because of the failure to supply the appropriate amount of nutritive material which that particular point in its state of weakness demands. Hence, a lesion of the atlas may represent a mal-nutrition condition of any part of the body.

Misplacement of the first cervical vertebra may also produce an impingement on the first and second cervical nerves. The first cervical nerve comes out at the occiput and the second cervical nerves comes out between the first and second cervical vertebrae, so that any misplacement of the first cervical vertebra will mean an impingement upon those two cervical nerves. What is the result of this impingement? The result will be to send down reflexes to the peripheral fibers of those two cervical nerves. How? Over the posterior branches, to manifest themselves, for example, in connection with ~~xxxxxxx~~ a hypersensitive condition of the scalp at the back of the head, the same hypersensitive condition of the sub-occipital region or the deep muscles that are found in the back of the neck, around what is called the curved line of the occipital protuberance. Why? Because the blood supply through the cutaneous branches of those posterior nerves represents the blood supply to the scalp, the sub-occipital muscles and the upper neck muscles. We may find, for example, soreness and intense contracture of the suboccipital muscles. Take, for example, those muscles that are primarily involved in the rectus capitis posterior (major and minor); the obliquus superior, inferior and complexus and the lateralis.

This first cervical nerve also sends branches to the sympathetics. These communicating branches go to establish connection with the tenth cranial nerve (the pneumogastric) and the 12th cranial nerve (the hypoglossal). If the atlas should impinge upon these nerve fibers which represent the communicating branches, then the pathological condition will be reflected sympathetically over these communicating fibers, and in that way there will be an involvement of the first sympathetic branch of the first cervical nerve communicating directly in that case with the superior cervical ganglion of the sympathetic. This same lesion may affect the nutrition to the entire head, to the eyes through the carotid and cavernous plexuses, those branches passing up along the path of the internal carotid blood supply and being distributed in the form of minute nerve fibers to the iris and the ciliary muscles in connection with the eye, so that a lesion involving these cervical nerves will pass sympathetically to the eyes, and will give us pathological conditions of the eye in the nature of atrophic conditions or non-trophic conditions. These are to be distinguished on the basis that we mentioned before.

There is also a communication in connection with the same sympathetic fibers and the motor oculi which supplies all of the muscles of the eye and of the orbit of the eye, excepting the superior oblique and the external recti muscles, - these last muscles being innervated by the pathetic and abducens, the fourth and sixth cranial nerves. These two cranial nerves also receive fibers in connection with the cavernous plexus from this same point in connection with the atlas, therefore any lesion that affects the first, second or third cervical nerves will affect all the muscles of the eye, because they receive fibers from the cervical nerves through the sympathetics as well as direct communicating fibers from the sympathetic nerves and from the cranial nerves. Hence,

the atlas is one of the most important points of lesion in connection with all disturbances that involve the eye, the back of the head, the muscles around the sub-occipital region and the muscles in the upper part of the neck.

The ear also received communicating fibers from the sympathetics along the course of the middle meningeal artery, communicating fibers passing along the path from the upper cervical vertebrae, especially the first and second. Now, these fibers are vaso-motor fibers and they follow the path of the arteries, and as the sympathetic fibers men the control of the circulation along the carotid path, any impingement upon these nerve fibers which control, vaso-motorly, the blood supply to the ear will influence the circulation of the ear. For example, in ringing in the ears, what is technically called tinnitus auctans, there we have a lesion frequently in connection with the third cervical. Why? Because of the connection through the great auricular branches of the pneumogastric, (the tenth cranial) and the facial (the seventh cranial) nerve. Hence, in cases of ringing in the ears, one of the most successful treatments for temporary palliation, that is to check the ringing in the ears, is strong inhibition right between the second and third cervical vertebrae; and if the disturbance is due to a vaso-motor condition it will stop the ringing in the ears.

There has been considerable discussion among different writers as to what produces the ringing in the ears and there is quite a difference of opinion as to what is the cause. My opinion is that it is a vaso-motor disturbance, just the same as the headache in which you have the feeling of the little hammers in the head. The throbbing and pulsating headache, so the ringing in the ears is a pounding in the ears is a pounding in the ears against vaso-motor disturbance. The relief of that condition may take place in connection with the first, second or third cervical vertebrae. Why? Because that relieves the vaso-motor condition of disturbance. In the ringing of the ears we have (1) hypertension of the blood vessel walls, - drum; (2) increased blood pressure which produces at each segment of the blood a hammering action. This is produced (1) by irritation of blood circulation in the meningeal artery field producing pressure; (2) irritation of the nerves causing tension.

Lesions of the atlas are especially found in connection with diseases of the ear, particularly where the misplacement of the atlas is found to the same side as the ear that is involved. Why? Because the displacement of the atlas impinges upon that nerve supply which is distributed along the path of the middle meningeal artery to the ear, and causes either a decrease or an increase of the blood supply in connection with the ear.

The nose, the pharynx, the larynx, the mouth, the tongue and the face in general are also found involved in connection with lesions of the upper cervical vertebrae. Why? Because the communicating fibers from the cervical plexus supply those different points we have mentioned; the nerve supply, for example, in connection with the hypoglossal nerve, the pneumogastric nerve, the glossopharyngeal nerve, the facial nerve and the branches of those nerves which freely supply the face, the mouth, the nose, the throat. For example, supposing the nose receives an over supply of blood. The result of that is the development of polypoid growths. Supposing, on the other hand, that there is an under-supply of blood to the nose, then we get the dry mucous membrane which is characteristic of certain nasal conditions. The same thing is true of the pharynx, larynx and the mouth.

We have found already that a free and unobstructed flow of blood is an essential, and this free flow of blood is regulated always by the nerve supply, hence an impingement involving the first, second and third cervical vertebrae may produce what is commonly called sore throat, tonsillitis, hypertrophied conditions of the tonsils, quinsy, deficiency of circulation and nutrition in connection with the brain. Cut off the direct nerve supply and the blood supply to the medulla and cause diphtheritic scarlet fever, neuralgic conditions of the face, mouth, throat, etc.

Lesions of the atlas then deprive the brain of its nutrition, cut off the blood supply and the nerve supply to the medulla, lesions first to fourth cervical vertebrae, and therefore may interfere with any of the great vital activities which are presided over by the medulla, the medulla presiding over the great functions of heart action, respiration, vaso-motion, etc. a mass of other functions that are spoken of as vital functions or vital activities.

Lesions in the cervical region may also affect what is called general sensation all over the body, because the centers of general sensation are located from the first cervical down to the fourth dorsal; that is the area that is called the area of general circulation. The kidneys may be affected by a lesion involving the cervical region. Why? Because of the influence of the sympathetics. The uterus may be affected, because of the influence of the sympathetics, through the cervical plexus in connection with (a) the heart and (b) the aortic blood supply which modifies the blood in the pelvic region. The first, second and third cervical are closely connected through what are called the communicating fibers of the cervical plexus and through the sympathetic system in general, with any part that is supplied from the sympathetic nervous system therefore may react on any field through the sympathetic brain. Therefore, any sympathetic lesion, anywhere in the body, may be traced upward, and in all probability will be traced upward to the first three cervical vertebrae, because those represent the primary relation of the spinal nerves to the sympathetic nervous system through the communicating nerve fibers, as they are called. The atlas figures more prominently in those lesions than any other of the cervical vertebrae. Why? Because it lies above the others. It practically represents the keystone, as we may call it, of the spinal column, and it is most likely to affect the nervous system because of its close relation to the suboccipital region. Hence, in paresis, paralysis, the different plegic types, monoplegic lesions are frequently traced up to the atlas because of the interference with those communicating nerve fibers between the spinal nervous system and the sympathetic nervous system.

Along the transverse processes of the second, third and upper part of the fourth cervical vertebrae we find the superior cervical ganglion. Now this represents the upper limit of what is called the cervical brain, the lower limit of the cervical brain extending down to the fourth dorsal. From this superior cervical ganglion which represents the upper limit of the cervical brain the nerve fibers pass out directly along the internal carotid artery, dividing and forming two plexuses, one on either side; the outer plexus being called the carotid and the inner plexus the cavernous plexus. From this point, that is, the point of these two plexuses, minute fibers pass along the branches of the internal carotid to the gasserian ganglion. Now this gasserian ganglion lies on the fifth cranial nerve, the tri-facial nerve, so that any connection of the tri-facial nerve with the face may be establish-

ed with this upper cervical region through that gasserian ganglion. This fifth cranial nerve is called tri-facial, as you know, because it has three great facial branches: the superior orbital which comes to the surface in a little notch, just above the eye, towards the inner canthus of the eye on the supra-orbital ridge; the inferior orbital branch of the tri-facial nerve lies in a line almost perpendicular down from the supra-orbital, slightly branching out from the nose. You will feel a little hollow right in there where the inferior orbital nerve comes out to the surface. The mental branch of the tri-facial nerve comes out on the lateral side of the chin, almost in a straight line from the supra-orbital and the inferior orbital branches. These are the three nerves that are involved most commonly in neuralgia of the face, and while pressure over those three branches may temporarily check the neuralgic conditions we require to go back to the atlas and the axis for treatment in connection with the primary supply of nerve force and the blood supply in connection with these tri-facial branches.

The nerve supply in connection with this gasserian ganglion is divided up into different parts. The ophthalmic branch supplies the orbit of the eye, the upper jaw, the upper teeth and those parts of the face around the upper jaw. The inferior maxillary supplies the lower part of the jaw, the lower teeth and the fascia fat and so on that is found in connection with that lower jaw; it also supplies, in connection with the lingual branch, a part of the tongue, and in that way is associated, indirectly at least, with the hypoglossal nerve in connection with the sense of taste.

This same nerve also supplies sensation and nutrition to the whole region of the face in which it is distributed. The inferior maxillary branch, that is the branch which supplies the lower jaw, and the parts around the lower jaw, also has a motor function, because it receives a motor branch just after it passes through the foramen ovale at the base of the cranium. As a motor supply in connection with this branch it acts as a nerve of special sense in relation to the sense of taste in the tongue.

Now the carotid plexus supplies the abducens nerve in connection with the communicating fibers, and it is the sixth cranial nerve that supplies the external recti muscles, the inferior recti muscles of the eye. It also supplies the ciliary ganglion of the fifth cranial nerve, sending fibers along the carotid artery and supplying the dura mater, the outer covering of the brain. It also supplies the tympanum of the ear in connection with the tympanic branch of the glossopharyngeal—the ninth cranial nerve.

Now this shows us the wide field that is affected by the displacement of the cervical vertebrae. Contracted muscles, tightened ligaments anywhere on the face, around the base of the cranium, in the neck, within the eye, the mucous membrane of the nose, of the mouth and a part of the tongue,—all of these represent possible lesions that we find in connection with the first three cervical vertebrae. From this point of origin, that is the first three cervical vertebrae, the nerves pass out into the trunk, and through the sympathetic nervous system, the kidneys, the uterus and pelvic organs in general are supplied. The intestines are supplied, sympathetically, in connection with these fibers, this region being sometimes called in this connection the general vaso-motor region for the entire body. By that general vaso-motor region I mean the first three cervical vertebrae, that region we have been discussing all along.

Another point that we find in the cervical region is the phrenic nerve. This phrenic nerve originates in connection with the spinal cord, from the third, fourth and fifth cervical, and the distribution of it is to the under side of the diaphragm. There is also a distribution of the phrenic to the pericardium, hence lesions in this third, fourth and fifth cervical region may bring out cases of asthma, where the diaphragm is involved, hiccoughs, pericarditis. The third cervical region, standing by itself, represents a center for the rhythm of the heart, and it also represents a center for the auditory nerve and the optic nerve. This explains a point that is of some importance. You will find a patient, for example, with palpitation of the heart, or a patient in the act of fainting complaining of hearing sounds in the ears and seeing spots before the eyes. Why? Because eyes, ears and heart are combined together at this third cervical vertebra, and that is a point where I have several times been successful in preventing a patient from fainting by simply applying strong inhibitory pressure on both sides of the region of that third cervical vertebra, when the patient complained of some of those symptoms that manifest on-coming palpitation or fainting. The fourth cervical occupies the same position in relation to the heart. The fifth cervical affects the ciliary region of the eye, and in that way it is in close connection with the accommodation of the eye, especially to different kinds of light, to different distances and to dissimilar objects. I make that specific, why? Because the real ciliary spinal center is lower down; it is in the upper dorsal region, that is, the center of cilio-spinal visceromotor; but this fifth cervical is specific center in relation to light and color, because these are the two points that come out physically in the eye in regulating distance, dissimilar objects and one color of light in relation to another color of light. The sixth cervical is the field of location for the middle cervical ganglion of the sympathetic system, and here we have a close connection established with the cervical plexus and the sympathetics, especially in relation to the acceleration of the heart, and more particularly in relation to the functional activity of the thyroid bodies, the fifth and sixth cervical representing general vaso-motion and the heart center.

The seventh cervical sends out fibers to the pulmonary plexuses, and it also represents a point of control in connection with the lymphatic system. The lymphatic system in general is controlled by the nerve supply which we get over the transverse processes, anterior to the fifth, sixth, and seventh cervical vertebrae and the first rib, the first rib having a special physical relation to the thoracic ducts on both sides, and to the subclavian vessels into which the thoracic ducts throw the lymph.

From the cervical region also the action of the heart is controlled inhibitorily. Now this is done through the spinal accessory branches of the tenth cranial or the pneumogastric nerve. These spinal accessory branches originate from the first to the sixth cervical, posteriorly, along the spine. A similar effect may be gained anteriorly in connection with that same region along the inner border of the sterno-cleido-mastoid muscle, where the pneumogastric nerve passes down as it comes down along the neck to enter into the thorax. The seventh cervical and first dorsal, the first rib and the clavicle represent the thyroid bodies. The brachial plexus, fifth cervical and first dorsal represent motion, vaso-motion and nutrition for the arm.

This is the way in which the nerve supply is distributed through the sympathetic system to the heart. The sympathetic system to the heart is reached anteriorly over the transverse processes of the cervical vertebrae.

brae, from the second cervical down to the sixth cervical, the region of the superior and middle cervical ganglia of the sympathetics. The inferior cervical ganglion in the region of the seventh cervical and the first dorsal, is an inhibitory nerve and represents an inhibitory motor nerve in connection with the cardiac plexus, that controls from the same side as the pneumogastric and the spinal accessory fibers the rhythmic activity of the heart.

In connection with the spinal cord we have three great regions, corresponding with the three regional segments of the brain, as they are called, in relation to the nerve supply; the spinal cord is divided up into three brains, as they are called. (1) First we have what is called the cervical brain of the spinal cord that we have already referred to, originating from and receiving fibers in connection with the great plexuses from the first cervical to the fourth dorsal. (2) Then we have what is called the abdominal brain of the spinal cord; that is, from the first dorsal to the third lumbar; and then we have (3) the pelvic brain of the spine, from the tenth dorsal down to the fifth lumbar. (N.B. From the third dorsal to the tenth dorsal is the field of general nutrition).

These three brains represent three great masses of nerve fibers and ganglia, and they are important, why? Because through these three great regions all the organic functions of the entire body are controlled. That is, on the theory of segmentation these are the three great landmark regions which represents points along the spine through which the special organs and the special functions of these organs are controlled, both normally and abnormally,— normally in connection with rhythmic stimulation and inhibition; abnormally in connection with contracted muscles, distorted ligaments and misplaced vertebrae. Now these three great masses of nerve fibers and ganglia supply three great departments of executive activity in the organism: (1) the cervical brain, from the first cervical down to the fourth dorsal, supplies the great departments of circulation and respiration. These are both combined together, respiration is really a part of circulation. (2) The abdominal brain, from the fourth dorsal down to the third lumbar, supplies the great field of alimentation, including digestion, absorption and metabolism and secretion. (3) The pelvic brain, from the tenth dorsal down to the fifth lumbar, is a great mass of nerve fibers and ganglia which supplies the eliminative and reproductive organs. These great masses of nerve fibers have intimate connections with one another by communicating fibers, and yet there are certain areas that are definitely marked as the centers, in connection with which physiological centers are developed. What are these physiological centers? These physiological centers are groups of nerve cells combined together not on a structural basis, of necessity, but on a physiological basis. We find that same effect in the brain as we find in the spinal cord, and this forms the reason why in the brain, while we are asleep is the only time where there is uniform activity within the brain; while we are awake there is nonuniform activity within the cells of the brain because some cells are active, some are partially active, some are inactive, but while we are asleep they all are active, simply because they are all receiving their nutrition. During the activity represented by the psychic function or the psycho-physiological function, or the physiological functions of the brain, one cell is combined with another cell, or the cells are combined in groups on the basis of certain relations that are required for certain functions, and that same thing is true in the spinal cord as it is true of the brain.

The great vaso-motor area in the upper cervical region establishes a connection, for example, with certain cells down in the lumbar region, and those two become a center for the uterus, for the bladder, etc. That is what we mean by the physiological center, and it will explain the reason why we find lesions, we may find lesions anywhere in connection with any disturbance of any particular part of the organism, so that although I was to tell you all the lesions that I have found in connection with the stomach and the liver and the intestines and so on, the very first case you might strike might be entirely different from my experience, simply because one individual is always different from every other individual, and it depends entirely upon that nature of the established relations between a particular organ in the visceral cavities and the spinal cord what will be the point of weakness in the spinal cord in that particular case, and, as we said before, the disturbance in connection with the blood supply will always settle down at the weakest point, and that is the point that we speak of as the point of lesion. This depends on the fact that all visceral action is rhythmic and represents cycle action and all cycle action depends on three types of activity furnished by different fields.

In the dorsal region we find the seventh cervical and first dorsal centers of vertebral circulation in brain diseases, of the basilar arteries also in brain conditions (arterio-sclerotic), and of the thyroids and heart through the depressor nerve and inferior cervical ganglion of the sympathetics, represents the cerebro-spinal and sympathetic sides respectively. We have also the centers for the heart, bronchi and lungs, from the seventh cervical to the seventh dorsal. This region is divided into two parts (a) seventh cervical to first dorsal; (b) second dorsal to seventh dorsal; the latter is vaso-motor, the former visceromotor field. The lungs in this region are connected through the posterior branches of the spinal nerve, the posterior and the anterior horns of the spinal cord representing the centers, and the posterior pulmonary plexus representing the center right inside of the visceral cavity, where these spinal nerves meet in connection with the control of the lungs, co-ordinating with the vagi.

The lesions that are found in this region of the spine may be either primary, or the lesion may be primary in the lungs themselves, the lesion in the dorsal vertebrae in this case being secondary to the lung lesion. The method that we follow out in determining which is primary is to examine the heart and the lungs themselves by the different methods of palpation in order to find out whether the heart is structurally and functionally doing its work, and then to look to the vertebrae in the spinal region to find out what the condition of those vertebrae is.

(1) The great center that controls the heart, the bronchi and the lungs through this series of reflex centers in the upper dorsal region is found in a set of bodies that we find at the base of the brain among the basal ganglia, the corpora striata. (2) Subordinate to this great basal center we have the vital centers in the medulla; (3) and then we have the inferior cervical ganglion and the first dorsal ganglion of the sympathetics in the dorsal region, these two ganglia usually lying together, and in fact, forming a single ganglion in the human subject. That region is mostly influenced by the first rib, because these two ganglia lie in relation to the head of the first rib as it articulates in relation to the seventh cervical and the first dorsal vertebra. (4) Then the regional reflex centers are found in connection with the first five dorsal vertebra and corresponding ribs.

In relation to the heart we have from the sympathetic nervous system in three great branching nerves, the superior cardiac nerve, branching out from the superior cervical ganglion, the function of these nerves being sensory; the second nerve is called the middle cardiac nerve, branching out from the middle cervical ganglion, the function of this nerve and ganglion being motor accelerator; the third nerve branching out from the inferior cervical ganglion and the first dorsal ganglion, the function of this nerve and ganglion being motor inhibitory. The superior cardiac nerve branches come out in connection with the superior cervical ganglion, but these fibers are traced primarily from the corpora striata as the great center of co-ordination.

The middle cardiac nerves arise in relation to the middle cervical ganglion, but they also originate primarily from the spinal cord, in the region opposite the middle cervical ganglion representing neuraxons of neuron cells in the anterior horns of the spinal cord; that is, the fifth and sixth cervical vertebrae region. The inferior cardiac nerves represent the inferior cervical ganglion and the first dorsal ganglion of the sympathetic, but they spring originally from the seventh cervical, the first and second dorsal vertebrae region, representing neuraxons of the neurons in this field.

In relation to the stomach and the intestines, the stomach is represented by the third to the eighth dorsal vertebrae, the duodenum, the jejunum and the ileum receive their nerve supply from the fifth dorsal to the fourth lumbar, and the colon from the second to the fifth lumbar vertebrae areas. This is to be noted particularly because the upper portion of the intestines gets up higher than any other part of the intestine, and being innervated from the upper dorsal, which also supplies the heart and lungs and stomach, we have the over-lapping of areas, not the distinct segmentation of areas but the overlapping of areas in the upper dorsal.

The second and third dorsal vertebrae represent the great cilio-spinal center in connection with which nutrition, trophicity and blood circulation to the eyes are regulated, distribution taking place (a) through the sympathetic chain and (b) in connection with the terminal fibers of the fifth cranial nerve. This is the region, for example, which causes dilation of the pupils of the eye, the impulses being traceable upward along the sympathetic chain and out along the branches of the fifth cranial nerve, to be distributed in the eye itself. That is, this is the point (second and third dorsal) where the blood supply and the nerve action are controlled in connection with lesions of the eye, especially those lesions that involve contractility or dilatation of the eye.

From the second dorsal downward along the dorsal and lumbar spine we get the region that affects the lower limbs, the fibers passing out from the cord in connection with the greater and the lesser sciatic nerves and the anterior crural nerve, the constrictor area being from the sixth dorsal to the second lumbar. The dilator area second to fifth lumbar. One center that is of great importance in relation to the spine is the center for controlling the circulation to the superficial fascia, including the superficial muscles along the spine. This center is of importance especially because if there is a lesion involving the center it prevents the equilibration of the circulation through the superficial muscles and the fascia, and therefore represents static conditions of the blood supply and of the lymphatic fluids that are found associated with those muscles and superficial fascia. At the second and third dorsal we find that center for the upper part of the body trunk so that when we want to control the superficial sub-cutaneous tissues the great center is locat-



ed at the second and third dorsal. From the second to the fourth dorsal we have a distinct area which controls the valves of the heart. This is the region where we find lesions in connection with valvular incompetency and endocarditis.

At the fourth and fifth dorsal, especially on the right side, we have the center for the stomach (cardiac orificé) and we also have a center for the stomach at the sixth and seventh dorsal, in connection with the control of the pyloric orifice of the stomach, the body of the stomach being controlled through the pneumogastric nerve and the spinal nerves that are located in the sixth and seventh dorsal region of the spine. At the fifth to eighth cervical and first dorsal we have the center which controls the blood supply motion, nutrition and vaso-motion to the arms. That is a center that is of great importance in connection with cold arms, sweating hands and paralytical affections of the hands and arms. This center controls the caliber of the blood vessels, and through the control of the caliber of the blood vessels it controls the tension of the arterial blood supply, both from the standpoint of contraction and dilation from the rhythmic side. That is the point where you very commonly find disturbance in old people.

At the fourth dorsal is the lower limit of the center of sensation for the entire body. Now this is important because lesions in that region may be found affecting any part of the body, from the head to the feet, if sensibility is involved, the region extending up as far as the first and second cervical.

The fourth, fifth and sixth dorsal represents an area which is of great importance because of its co-ordinating function. For example, this is the center that co-ordinates the movements of the entire body. When we find a lesion in that region, there is liable to be some deficiency in co-ordination at the weakest point, functionally in the body. In discussing the lines in connection with the body we found that the fourth and fifth dorsal was the weakest point in the spine, and that is probably the reason why, from the mechanical standpoint, a lesion in that area affects so much the co-ordination of the entire body. There is another reason why that should be the case. That fourth and fifth dorsal seems to be the point where the abdominal cavity and the thoracic cavity meet in connection with nerve control the fifth beginning the splanchnics and the fourth dorsal ending the thoracic splanchnics. The regional center for the upper portion of the intestine is in that area (4th and fifth dorsal) and we will find later on that this is an area that controls certain functions in relation to the uterine organs, the kidneys and the blood supply to the lower extremities is from the same point (fourth and fifth dorsal) The reason for that is found in this, that is the area for the valves of the heart. The functional activity of the valves of the heart center controls the activity of the abdominal aorta, and the abdominal aorta in its tension or lack of tension represents the principal factor in controlling the blood supply to the kidneys, the uterus and the lower extremities, - all of these organs receiving their blood supply by a direct branching process from the abdominal aorta; in fact, heart pressure is kidney pressure; heart pressure is also uterus blood pressure and lower extremity blood pressure.

The greater splanchnic nerve, abdominal, originates in the spine, from the fifth dorsal down to the tenth dorsal, but recent physical investigation has brought out the fact that there are fibers joining that greater splanchnic nerve as high up as the first dorsal, so that the real greater splanchnic area in the spine is from the second dorsal down to the tenth dorsal. The first dorsal vertebra really belongs to the cervical region and not to the dorsal region. The first dorsal ganglion is really a part of the inferior cervical ganglion of the sympathetic. The lesser splanchnic

represents the tenth and the eleventh dorsal, and the least splanchnic the twelfth dorsal. Now these splanchnic nerves distribute fibers to the great abdominal plexuses and to the ganglia, the greater and lesser through the solar plexus, as the trunk brain, and in this way they provide the basis for innervation to the visceral organs all the visceral organs within the abdominal cavity, including the stomach, the liver, the kidneys, the intestines and probably also the pelvic organs, through the hypogastric and pelvic plexuses; also distribution to the thoracic organs, the solar plexus going up as high as the oesophagus. The liver has its own specific center at the eighth and ninth dorsal on the right side, and also a direct nerve supply in connection with the tenth cranial and phrenic nerve, as well as an indirect nerve supply from the inferior cervical ganglion of the sympathetic, the seventh cervical, the first dorsal and from the splanchnics.

The spleen has its center at the eighth, ninth and tenth, eleventh and twelfth dorsal on the left side, and it represents the organ which is of great importance in connection with blood regeneration with the development of the leucocytes, or the white blood corpuscles. Hence, from the osteopathic standpoint, the eighth to the twelfth dorsal on the left is the great center that is of importance in malarial and other fevers, and in all of those diseases that are more or less associated with germs, those white blood corpuscles having the phagocytic function, the spleen supplying these white blood corpuscles with stimulus in connection with that phagocytic function.

In relation to the uterus there are four great central areas in the spine: (a) The first center is in the upper cervical, first, second and third. Why? Because that is the region for the general vaso-motor control. This is the center for the reflex uterine headaches. (b) The second regional center in connection with the uterus is at the ninth dorsal, where we find the center of sensation for the cervix of the uterus. The cervix of the uterus is like the endocardium-- origin of all sensation in the uterine field. In sensitive pains at parturition distinguished from labor pains, inhibit strongly at ninth dorsal. This is the sensory field. (c) Then we have the direct uterine center at the second and third lumbar, in connection with rhythmic uterine contractions and dilations (viscero-motor) That is called the parturition center (viscero-motor). (d) The last center is at the second and third sacral region, where we have a center that sends out fibers directly to the vaginal walls and the cervix cervical portion of the uterus.

At the sixth to the eleventh dorsal we have the centers that control the action of the peristaltic movements of the intestines. If the peristaltic movement of the intestine is lessened then the movement of the contents of the intestine does not take (a) place properly in the forward direction and the result is an established condition of the motor type of constipation. (b) the ninth, tenth and eleventh dorsal is one of the regions that we find affected in cases of constipation; that is, the vaso-motor type of constipation. (c) There is another type of constipation that is associated with the lumbar region, second, third and fourth lumbar. That may be the center either in connection with constipation or diarrhoea. In the case of constipation it is usually associated with paralysis or semi-paralysis of the lower part of the large intestine, including the rectum, and in this case there is most probably an affection of the tenth cranial nerve at the same time as the lumbar nerves, because the fibers of the tenth cranial nerve are distributed in the intestinal walls down at least so far as the sigmoid flexure. Lesions in case of rectal paresis are (a) second to fifth lumbar, from the inhibitory side, in relation to the mesenteric plexus; (b) from the motor side, third, fourth and fifth dorsal and second, third and

fourth sacral.

The kidneys are represented by the eleventh and twelfth dorsal, directly through the renal splanchnics. We get, however, indirect effects in connection with the kidneys in connection with lesions as high up as the second dorsal. (a) From the second to the sixth dorsal we have a center that affects the kidneys through the involvement of the valves of the heart. (b) Sometimes kidney lesions are found in the superior cervical ganglion region, because that is the region for the general vaso-motor control of the blood supply of the entire body. There is one important fact in relation to the kidney that we must always bear in mind, that the kidney is one of the organs in the body that has a single vaso-motor nerve supply. It has not, like the other organs of the body, a double vaso-motor nerve supply; that is, it does not have both constrictor and dilator fibers. This is the reason why renal diseases are almost a constant complication or sequel to every disease, simply because whenever there is an involvement of the blood circulation anywhere in the body it may settle down by reaction in a state of the kidneys, and the kidneys have no power in themselves and the nerve supply has no power to force the blood out of the static condition. This is the reason why mechanical therapeutics comes out ahead of medicinal therapeutics, because there is no way that you can remove that static condition of the kidneys excepting by mechanical therapeutics. Any medicinal agent that may be applied, even supposing it controls the vital force and nerve supply, has only one nerve supply to operate through. For that reason the only way that we can establish the free drainage is from the mechanical standpoint. That is the basis, I believe, on which a great number of cases that are supposed to be cured by mechanical treatment are cured osteopathically, whereas they are not either Bright's disease or Diabetes, but simply functional disorders in connection with the kidney separating process, a reaction from some other condition.

(c) There is another center for the kidneys at the second lumbar. This is the center which controls the pelvis of the kidney and the ureters, and is called the micturition center, that is joint voluntary and automatic center. The function of the kidneys is two-fold. First it has the function of eliminating or throwing off the excess of water, salts, etc. found in connection with the depletion of the body; that is, kidneys, the natural depletion of the body. In addition, the kidneys have a second function, namely, the selective function; they have a selective power, which represents the formation of an internal secretion.

This raises the question of the ductless gland function. The kidney is classified among the ductless glands, because it forms an internal secretion that is of considerable value (a) in relation to the nutrition of the kidney itself, and (b) probably in the nutrition of the nervous system. That forms the basis, I believe, of many cases, so-called cases, of diabetes and Bright's disease. These are simply cases of functional derangement in connection with this selective process of function which the kidney exerts over the blood supply, and through the blood supply on assimilation. The general center for the large intestine is from the first to the fourth lumbar, the second lumbar being the special center for micturition, parturition and defecation, that is, the voluntary automatic center.

In cases of enuresis, constipation and diarrhoea, this area (first to fourth lumbar) is the important point to look after. For example, enuresis very frequently gives a posterior condition of these lumbar vertebrae, and the correction of that posterior condition has, in our ex-

perience, corrected the enuresis. In some cases the soft tissues around the second to fourth sacral are involved- enlarged tissues. At the second lumbar the spinal cord terminates. There we have what is called the filum terminale. Below that point we have only osteopathic centers. A physiological center is a combination of nerve cells on a functional, not a structural, basis, and in connection with those nerves that come out below the second lumbar, the physiological connection is established with some point above that connection with the spinal cells.

The third lumbar is the great center for the coeliac axis, the greatest convexity of the abdominal aorta corresponding with this vertebra. This coeliac axis is a large branch of the abdominal aorta and it branches into the gastric, hepatic and splenic arteries, these dividing up and branching in connection with the viscera of the abdominal cavity. The third lumbar, in its connection with the aorta, with the coeliac axis through the aorta, makes it the point of blood co-ordination, and especially in connection with conditions of aneurism.

At the fourth and fifth lumbar we have the center for defecation, secondary to the center at the second lumbar, and these are the two centers that control the voluntary and the involuntary sphincter muscles of the lower part of the rectum. At the same point, the fourth and fifth lumbar, we have the genito-urinary center, which, in connection with the hypogastric plexus, as the largest part of the pelvic brain, represents the direct pathway for all the impulses to the genital and urinary apparatus. That is the region in which we find seated most of the lesions in connection with genito-urinary disturbances of all kinds, including disturbance of the ureters and the bladder..

The fifth lumbar is the great center which, vaso-motorly, controls the circulation to the superficial fascia of the lower part of the body trunk and the extremities, and it is also the center that controls the circulation in the pelvis. Hence, in the field of gynecology one of the most common lesions that is found in all conditions of pelvic inflammation and congestion is a lesion involving the fifth lumbar vertebra. I saw one case in the city of pelvic congestion, of two years standing, treated all that time medicinally, which we in the college clinic relieved by two treatments; these treatments consisting in specifically treating the lumbar vertebrae for an anterior condition of the fifth lumbar vertebra. That is the point that is well marked in female troubles, -the anterior condition of the fifth lumbar vertebra. In disturbances involving the male organs, there is more frequently found a posterior condition of the fifth lumbar.

From the sixth dorsal to the coccyx is the region that is generally spoken of as the area of nutrition, because it governs the nutritive conditions of the entire body.

In the sacral region we have certain accessory nerve connections to portions of the spine in the cervical, dorsal and lumbar areas. For example, we have an accessory nerve supply to the fourth and fifth dorsal in connection with genito-urinary disturbances. The question is why, in urinary disturbances, do we frequently find lesions in the upper cervical region, at the fourth and fifth dorsal, as well as in the lumbar and sacral regions of the spine? The reason for that is found in the fact that (1) a lesion in the upper cervical region disturbs the vaso-motor control of the circulation; (2) all work is done in connection with the genito-urinary system directly through the trunk brain, that is, the solar plexus, represented by the fourth and fifth dorsal; (3) the hypogastric plexus is simply an adjunct to or a part of the trunk brain, and the hypo-

gastric plexus is represented by the fourth and fifth lumbar and the sacral region; (4) from the sacral region there go out directly what the physiologists call homologues of the white rami communicantes. These white fibers go out directly from the sacral region without passing through the sympathetic ganglia, and in that way any obstruction in connection with the sacral region will mean an obstruction to that direct nerve supply. These sacral nerves include (1) motor fibers to the hemorrhoidal plexuses of the rectum, to the vesical plexuses to control the bladder walls; (2) sensory and motor fibers to the bladder and vesiculae seminales; (3) vasodilators through the pelvic plexus (nervi erigentes) representing visceral and splanchnic branches passing directly to the plexuses and viscera, especially the penis through the prostatic plexus; (4) motor and vaso-dilator to the vagina, constrictor fibers to the neck of the uterus, and motor fibers to the rectum through the hypogastric plexus. Now the importance of that is found in the fact that we will find it in discussing the sympathetic system.

The sympathetic system in its ganglia has the power of the re-organization of impulses, and an obstruction in connection with a spinal nerve does not necessarily have the same effect as it would have unless the sympathetic system refuses to reorganize the impulse or the set of impulses that come to it from the spine. Hence, when the spine sends out, as it does in the sacral region, the nerve supply direct to the organ, there is no possibility for reorganization, and that is the reason why we have at the present day such a mass of genito-urinary disturbances, both in the male and the female, simply because the sympathetic system does not exert any re-organizing effect over the functions of those sacral nerves that go out and are directly distributed to the genito-urinary organs.

At the same time it represents another fact, that these genito-urinary disturbances are very easily corrected, if taken before permanent reactions are established, simply because in correcting the condition of the sacral region and establishing the free communication between the sacral nerves and these genito-urinary organs, the disturbance is entirely removed. There are the records of many cases in which supposed long standing cases of impotency in the male have been absolutely corrected by from one to three treatments at almost any age.

### HEADS' S LAW.

The Human Body is an organism, the organic side of which is the nerve and blood supply, the mechanical side being represented by apparatus used by the body in originating, determining and carrying out its functional activities through energy. The great function of these apparatus from the mechanical side is to form and transform heat, energy and activity and to distribute these in the proper proportion to the different parts of the body organism. Any interference with the formation, transformation or distribution of heat, energy and activity represents lesion and (a) will result in disordered mechanical conditions affecting principally the distribution; (b) will produce disturbance of organic conditions, affecting principally formation and transformation of heat, energy and activity.

These two points cover all the disturbances that can take place within the organism, the one from the organic side (b) and the other from the mechanical side (a). Osteopaths who limit the lesions to the bony (osseous) system, limit the disturbances to the distribution (a) and do not

take account of the organic part of the disturbance.

Head's Law rests on (b), representing the organic side of disturbances, that is, Head's Law rests on mechanical side for its cause and on the organic side for its field. These changes take place primarily in connection with oxidation. Oxidation implies (1) Oxygenation—the proper supply of oxygen by the respiratory system. This presupposes the entire physiology of respiration. (2) The combination of oxygen with some other chemical element to produce a combustion process, the supply of H and C being furnished by the digestive metabolism and absorbent fluids. The action of these upon one another results in the formation and transformation of heat and energy.

The most important part of the excretory part of the organism is the skin because the skin is closely allied to the nervous system, both originating from the same embryonic layer, namely, the epiblast. This is the reason why the skin received all sensory stimulus from without. These stimuli are (1st) sensitive, that is, appeal to sensitiveness of the organism; (2) when the sensitive impulses are received into consciousness in the sensorium become sensations. Sensation, therefore, is the knowledge which the sensorium has, or acquires, of a superficial stimulation. The great function of the skin is to receive the stimulation and to transmit it as an impulse. The stimulation becomes a sensation, only when, and if the skin is closely connected with the sensorium through the central nervous system. The sensorium is located in the posterior third of the cerebral cortex, the cortex being divided into three parts, corresponding in general with the three original brain vesicles, anterior, middle and posterior or hindbrain. These areas are (1) the middle, or the motor area; (2) the anterior, or the indifferent area; and (3) the posterior, or the sensory area, sensorium.

Sensations, which are so only in the sensorium, are converted into impulses as they are co-ordinated and transmitted from the sensory to the motor fields of the nerve centers, co-ordination taking place (a) on the sensory side and (b) on the motor side. The history of the movement will be as follows: (1) the stimulation of the skin or some superficial structure, like the mucous membrane in a cavity or the synovial membrane in a joint (stimulation, that is, sensory stimuli, or sensory stimulation); (2) the conversion of a sensory stimulation into a sensitive impulse (sensitiveness); (3) the transmission of the sensitive impulse towards the sensorium along the sensory path represented by the posterior nerve roots and the posterior columns of the spinal cord (sensation); (4) the transfer from the sensorium to some motor area, either (a) in the cortex or (b) in the basal ganglia (co-ordination of sensation); (5) The transmission of the impulse as a motor impulse towards the periphery, so as to reach some motor field of activity, such as muscle, organ, anything that has the motor function (motivity).

The transmission of these impulses is designed: (a) to furnish the basis for all the movements of the organism, (motion and locomotion); (b) to keep up the tonicity of all the tissues and the organs of the body. All these impulses may be traced back to the skin or some surface corresponding with the external skin surface.

Physiology distinguishes between high and low sensibility. High sensibility is associated with the surface internal or external because that part of the nervous system is both irritable and excitable under stimulation. Irritability is the normal condition of all tissue; excitability is irritability plus stimulation. Low sensibility applies to the deep tissues because these have less excitability, probably in some cases no ex-

citability, and irritability than the surface sensibility.

**HEAD'S LAW.** When a painful stimulus is applied to a point of low sensibility in close central connection through the central nervous system with the point of high sensibility, the painful impulse is felt at the point of high sensibility, and vice versa. The foundation of this law is in the anatomical fact that the same nerve trunk supplies through its branches both the deep and the superficial parts. Sometimes we speak of pain in muscles, which, however, is a physiological impossibility. Pain as an expression of a painful stimulus can only be felt on an internal or external surface, therefore, the pain, if associated with muscle, is on its surface, not in the muscle itself. Low sensibility is found in those parts away from the surface, for example, the skin and muscles around a joint have a correlative nerve supply. When we speak of articulations it includes the ligaments, cartilages and synovial membranes, but the last only is implied in pain. This explains the pain we find in rheumatism.

The viscera and skin also have a correlative nerve supply, hence we speak of a liver reflex, a lung reflex, a heart reflex, a stomach reflex, the reflex being located right over the skin area corresponding with the organ.

Pains along the spine indicates an expression at a point of high sensibility, of over-stimulation or lack of blood supply in the spinal muscles, or in the internal organs, for example, in angina pectoris there is a feeling in the heart as if it were crushed in a vise, sometimes with a pain in the left arm and on the surface of the skin in the heart reflex area. Lambago is a pain representing in most cases a disturbance of the kidneys, the primary condition being sensitiveness of the kidneys, showing itself by pain from the first to the third lumbar vertebrae. Pelvic pains are of two types: (1) Sacro-iliac; (2) sacro-lumbar, representing the superficial expression of sensitiveness to irritation of the pelvic organs, for example, the ovaries, the uterus, etc.

Head's Law is of value both in diagnosis and therapeutics:

(1) In the field of Diagnosis it enables us to trace pain through its cause, explaining why the expression of the pain takes place at a particular place. For example, stomach pain is located on the right side of the back from the fourth to the eighth rib. Also stomach pain may be found over the lower sternal bones and corresponding cartilages, particularly towards the left side. In the lungs we often find pain on the left side between the shoulder blade and the spine and over the sternal ends of the ribs on both sides from the fourth to the eighth ribs. The lung condition represents pain. A pleuritic condition is a hypersensitive condition in the same area and hypersensitive conditions along the lateral sides of the thorax. In the spleen we find pain under the shoulder blade on the left side at the inferior angle. Heart pain is found at the second and third ribs and the fifth and sixth ribs, both anterior, the latter representing the regular heart reflex, the former the connection of the heart with the brachial plexus through the intercostal nerves, particularly in angina pectoris, representing a congested condition of the brachial plexus. Liver pain is found under the shoulder on the right side along the trapezius muscle, supplied by the spinal accessory nerve. A pain spot on the shoulder indicates a blood condition, also along the right side of the spine from the seventh dorsal down.

(2) In treatment, if Head's Law is applied, the treatment is called for at the point of pain, that is, expression of the pain. One of the old maxims of mechanical therapy was to locate the pain and keep working at the point of pain until the pain is removed. This is the applica-

tion of Head's Law because the point of pain indicates the point where the nerves can be relieved which supply the point from which the pain originates. In the therapeutic application of Head's Law we must remember that it is the central nervous system that we are trying to reach. The central nervous system can be reached:

A. Directly, by reaching (1) some of the essential nerve fibers that pass out or into the central nervous system. I say the essential nerve fibers, that is, the neuraxons, because to reach the dendrons or dendrites would not be sufficient; (2) through the center within the spinal cord itself, or within the brain. In this case the treatment is best given by articulation, the articulating of the column moving the cord and stimulating the nerve centers. In reaching the brain centers it is best done by vibration right over the brain area itself, including the cortex. Any portion of the cortex can be reached by vibration. Pressure treatment, or moving pressure, over the scalp may also do good because it reaches the brain through the scalp nerve supply. The best vibration is gained over the sutures, for example, in cases where we want to stimulate the brain or develop an undeveloped brain.

B. Indirectly, by what is called the reflex method. In this case the central nervous system can be reached through any other system, for example, the sympathetic nervous system, the visceral organs, the skin, the superficial muscles: (1) by steady pressure to inhibit the action of a motor or sensory nerve; (2) by moving pressure, to stimulate or accelerate. In this case the impulses may be stimulated directly through the center as well as indirectly, because nerve conduction takes place in both directions, both toward the center and periphery.

Another point in connection with Head's Law is the tone of the tissues. This represents the healthy, normal state of the tissue, tonicity consisting of: (a) partial contraction, predominating, and (b) partial relaxation existing simultaneously with the partial contraction. This indicates that tone does not refer to the cycle of the muscle, that is, contractility, but it refers distinctively to the tonic condition in which the muscle is kept all the time. Contractility refers to activity of muscle doing its work. Rhythm of muscle refers to the cyclical condition of muscle in a state of activity. Rhythm is contraction, relaxation, rest in succession. These three are successive in the cycle of rhythm. This means that the tone of a tissue is produced by the summation of the nerve impulses reaching the tissues from the central nervous system, the impulses originating from the corresponding point of high or low sensibility, according to Head's Law.

(a) These impulses are originated in the external portion of the body; (b) these impulses are carried to the central nervous system as sensations; (c) they are then carried from the central nervous system to the tissues and organs as motor impulses; (d) these impulses are distributed to the different tissues from the subcenters in the spinal cord. This is one reason why the spinal cord is divided into segments, representing the sub-ordinate segmental centers, sometimes called regional centers; (e) these tonic reflex centers are under the control of the great tonic rhythmic center in the medulla.

A center represents: (a) physiologically, a group of cells arranged in three cells or multiples of three cells. The separate cells are called afferent on the sensory side, efferent on the motor side, the central cell being between the two. The afferent cell is a terminal for a sensory nerve, the efferent the origin of the nerve of distribution. The central cell has the function of modification, classification and origination of



impulses; (b) osteopathically, the center is a convenient point or landmark on the surface of the body at which the nerve cell or fiber, or neurons, may be reached for treatment. The physiological center is one or two vertebrae above or below the osteopathic center.

There are a number of osteopathic centers that it is necessary to remember particularly, (1) the fourth and fifth dorsal, the center for the rhythmic action of the heart. We distinguish between the heart rhythm and heart beat, rhythm referring to the cycle in regard to periodicity of cycle action, that is, it refers to regularity. The beat refers to the force of the contraction because contraction is an important part of the cycle. Rhythm refers to the regularity of the beat as a whole. Beat refers to the heart force and its center is at the third and fourth dorsal.

(2) Centers of the rhythm of the lungs. These two centers are through the cardiac and pulmonary plexuses, the latter one being the more easily accessible, for example, in giving treatment at the fourth and fifth dorsal the first thing to be affected will be the lungs. Hence, we say osteopathically a light treatment in that area will reach the lungs, whereas a deep, heavy treatment at same point will reach the heart. There is always an advantage in treating the heart in this way because we reach the heart through the cardiac plexus through the pulmonary plexus. This explains the conditions when people seem to have asthma, yet they have not asthma; it is the heart condition, and in other cases when they are said to have heart trouble they have pulmonary trouble. The tenth cranial nerve on the left side only is important in relation to the heart and lungs (not on the right side, because the tenth cranial nerve establishes its main control over the stomach through the cardiac or pulmonary plexuses.

(3) Center for superficial circulation (fourth and fifth dorsal) over the surface of the body. This carries out Head's law because we get the superficial circulation and at the same time the deep circulation of the heart and lungs, the great organs that take all the arterial and venous blood and distribute it.

(4) The center for the cardiac orifice of the stomach (fourth and fifth dorsal). This is the reason for the relation of the gas formation to palpitation of the heart and some other troubles that we get in connection with the stomach and that affect the heart because the centers are located at the same point.

(5) The third dorsal is sometimes described as the center for coughing, because it represents some irritation that causes a modified respiration. Why? This is the point at which sensory irritation goes out to the bronchii and trachea. Therefore, to control a cough steady inhibition would be applied at that point. This applies only to the respiratory cough, it does not apply to the stomach, the liver or the intestinal cough.

(6) The second and third dorsal, sometimes called the oculo-spinal center, because this is the point that controls the visceral action of the ciliary muscles of the eye. For example, this is why we can dilate the pupil of the eye by inhibition at this point because this is both the vasomotor center that controls the circulation of blood through the ciliary ganglion and the visceral action of the ciliary muscles of the eye. At this point we get both viscerodilation and vasoconstriction action. Stimulate to get contraction.

(7) Sixth and seventh dorsal, the center of the pyloric orifice of the stomach. This center acts rhythmically and in opposition along with the fourth and fifth dorsal as the center for the cardiac orifice; for example, to control vomiting apply strong inhibition at the fourth and fifth dorsal, that will close the cardiac orifice. In a severe case of vomiting

inhibit at the fourth and fifth dorsal and stimulate strongly by articulation at the sixth and seventh, which latter will open the pyloric orifice and cause the stomach contents to go down into the intestines. To prevent gas belching inhibit at the fourth and fifth dorsal and stimulate at the sixth and seventh dorsal. Inhibitory at the fourth and fifth dorsal and stimulate at the sixth and seventh dorsal and stimulate the tenth cranial nerve above the clavicle to dilate the stomach. Articulation is the strongest treatment that can be given to stimulate. In causing vomiting inhibit first and then stimulate. In some cases you can produce vomiting by slight irritation of the right pneumogastric.

(8) The eighth and ninth dorsal, represent the center for chills, because these chills originate from a condition of the spleen, the spleen being either temporarily or permanently enlarged. Enlargement of the spleen causes irritating impulses to pass to the spine and from there to other organs. To stop or cure chills, give treatment to reduce the enlargement of the spleen, namely, inhibitory treatment followed by rhythmic treatment on the left side of the spine at the eighth and ninth dorsal. The rhythmic treatment consists of first stimulation then inhibition and so on in series. Stimulation is first applied to the steady heart. If the heart or other organ were disturbed or unsteady, inhibition would be applied first.

In dealing with the heart, to modify the rhythm affects are circulation, first the superficial circulation and later, the deep circulation. To overcome hypertrophy where the left ventricle is enlarged give articulatory treatment. Put the patient on the face on the table, stand on one side, catch the opposite side of the spinous processes with one hand and around the ribs on the same side to get leverage and pull in the same direction. In dealing with the upper part of the spine use the shoulder for leverage; for the lower part of the spine, below the eighth dorsal, use the innominate bone for leverage.

The nerve supply to the stomach is in three divisions. The two ends of the stomach are supplied by spinal nerves in connection with or through the solar plexus. The body of the stomach is supplied by the tenth cranial nerve. For this reason the tenth cranial nerve can be used in connection with vomiting only in one case, namely, when there is an excited peristaltic action of the stomach. In all other cases you require to treat through the openings or orifice, that is, through the fourth and sixth dorsal spinal nerves.

(9) The eleventh and twelfth dorsal sometimes is spoken of as the center for diarrhoea (vaso-motor type). Strictly speaking it is the center for the pain in diarrhoea, principally on the left side. The treatment to control the pain should be inhibition. If diarrhoea, then, is due to pain, it will control the diarrhoea, otherwise it will simply control the pain. This is very valuable, because sometimes it is advisable to control pain without checking the diarrhoea itself, the diarrhoea being an elimination process.

(10) The eleventh and twelfth dorsal and first and second lumbar represent the center for (1) Uterine and ovarian neuralgia. Important especially in connection with dysmenorrhoea. (2) The center for controlling the sensory pair in connection with parturition. The labor pains in obstetrics apply to the contractions of the uterus, located in connection with the third and fourth lumbar. This means that nature has provided for controlling sensory pain without interfering with the labor pains. The difference between the two is (1) applies to pain which relates to the sensorium as a center, (2) applies reflex pain originating from the

presence of the fetal bodies and reflexly. This treatment in connection with parturition may be called an anesthetic treatment and is best applied between the 9th and tenth dorsal vertebrae.

(11) The second and third lumbar represent a number of centers: (a) The center of micturition, that is, the visceromotor control of the pelvis, of the bladder and urethra, for example, in retention of the urine, distinguished from suppression of the urine, strongly stimulate at this point and this will have the same effect as the use of a catheter, unless there is some obstructive condition along the path of the urethra. This is the point for the control of incontinence of urine from worms or where the body is subject to intoxication, found in ptomaine poisoning and those cases using alcoholics, etc. (b) The center for defecation, that is, the visceromotor control of the internal sphincter of the rectum, that is, the voluntary control; the other sphincter is controlled from the sacral region, representing the involuntary side. (c) The motor parturition center in connection with the labor pains. To hasten parturition give strong articulatory treatment in that area. Where there is a tendency to miscarriage or abortion, a strong inhibitory treatment kept up persistently should be given in the same area.

(d) The center for locomotor ataxia, first, second and third lumbar. This is the point where sensations pass upward from the lower extremities into the posterior cerebellar tract towards the cerebellum, for example, this is the point where we find the origin of the girdle sensation of the lightning pains in locomotor ataxia. This is also the point for the beginning of lightning pains that pass down to the lower extremities in the early stages of locomotor ataxia. Through articulation and the thorough relaxation of the muscles at this point treatment will enable us to overcome this condition, as locomotor ataxia is generally a curable condition unless there is some extensive degeneration in existence, for example, as a result of extensive medication, the application of electric treatment and particularly if the patient is mercurialized, tends to prevent the curability, locomotor ataxia being very frequently secondary to syphilis.

(12) The SACRAL REGION. This region is the great center for dilatation in the entire pelvic region. The four sacral nerves represent the nervi erigentes and these are dilators to all the organs in the pelvis—rectum, ovaries, uterus, etc. A peculiarity about the dilators is that they do not pass through the sympathetic field, have no sympathetic relations; therefore you have fibers which can be directly influenced by treatment. The treatment called for to cause dilatation is strong stimulation. The best way to give stimulation in this region is to lay the hand over the sacral region so as to cover both sides, with the patient lying on the, and then elevate the limbs backward, applying pressure over the sacrum. This treatment will increase the circulation of blood in the pelvis, for example, in dealing with a case of suppressed menstruation. To establish the menses we must establish a pelvic congestion, that is, dilate the blood vessels in the whole pelvic region by stimulation. As an assistance, when the congestion is established, to cause the uterus to discharge the suppressed blood supply, direct tapping treatment, mechanically, directly over the symphysis pubis and over the sacral bones, so that a direct stimulus may be transmitted through the bones to the uterus, may be given. This treatment is also often given in uterine adhesions. In cases of excessive menstruation give the reverse of these treatments, that is, inhibit directly over the sacral nerves, and give mechanical inhibitory treatment instead of tapping.

Another question we have to answer is: What determines the distribution of impulses after a treatment? A law has been laid down which has been called "the path of least resistance", that is, impulses generated by treatment will always pass along the path of least resistance. If the body is absolutely normal all the pathways will be equally busy because all of the nerves are taking up their share of the impulses; therefore, no pathway is found open. However, if one of the parts of the body is abnormal the pathways to and from that part are disturbed and the impulses are not passing as in the normal condition. When the treatment is given nature picks up the impulses and adapts them to the necessities of the weaker part. This is one of the laws of nature in the physiology for the body, for example, if an injury is done to a part of the body the blood and lymph will hurry as fast as they can to that part of the body until there is a congestion established, because all the blood and lymph corpuscles are assisting the injured part. The same thing is true of the impulses.

If micturition is suspended or becomes feeble, the pathway of the impulses is less active than normal. If a treatment is given to remedy this condition the impulses are transmitted along the pathway of the organs of micturition; consequently, when a number of the centers are located at the same point, for example, the fourth and fifth dorsal, where we have four centers, the treatment results in the transmission of impulses to the aid of the functional condition that is weak. Some say that any kind of treatment will produce an effect on the body. This is not absolutely true, because if the body is absolutely normal any treatment at the heart center would not increase or decrease the heart action. If there is a tendency, however, to the abnormal, a light treatment would produce some modification of heart action.

MECHANICS OF THERAPEUTICS.

Previously we divided the subject of Therapeutics into two parts, the organic and the mechanical. All treatments from the osteopathic side are mechanical or organic in their application, that is, we use mechanics as the means or medium of appealing to the mechanical conditions of the organism. The question is: What can this mechanical treatment do? Mechanical treatment is therapeutic only if it develops in the organism a physiological condition as a direct result or effect or a reaction. This makes the relation between the organic and mechanical as follows: The organic applies to the internal- organic- diet, antacids, antiseptics are all internal medication,- the mechanical to the external.

The mechanical, therefore, has a place in the therapeutics because it can be converted into the organic equivalent. The organic conditions, for example, in relation to the centers can be stimulated or inhibited whenever these are called for. Summarizing what may be done mechanically in order to understand what we aim at and expect to produce on the organic side,

I. We can increase the circulation of the fluids of the body and remove waste. In diseases of all types one of the chief morbid conditions to be dealt with is the stasis of the fluids. This means fluid stagnation and if the stagnation continues it will result in the death of the fluid and finally in the death of the tissues supplied by the fluid.

Abnormal vital action found in the organism may be associated with; (a) Stasis of fluids, in which there is a slowing down of the circulation and obstruction in some particular area of the circulation, This represents a hyperphysiological condition or action, that is, physiological action that is above normal. (b) Congestion of fluids. This represents an excessive quantity of fluid in some local area. This is also hyperphysiological. (c) The tissues as a consequence are given over to chemical and physical changes. These changes may be two-fold:

(1) Of the nature of inflammation, that is, an excessive heat localized in the area of the hyperphysiological action or condition. This means the localized static condition of energy. (2) Degeneration or the breaking down of living tissues by the action of the chemical and physical forces of disintegration. These changes represent perverted physical action or perverted physiology.

(d) The dying of the tissues, in which case the tissues gradually become separated from the vital force that animates all living tissue and are left to die. Here we have also perverted physiological action.

(e) Resultant changes following the degeneration of tissues. This represents the morbid anatomy of pathology proper in which the histologic structure of the tissue is altered.

These five changes are given in the natural order in which they occur and they cover the ground that is naturally called pathology. The basis idea of this pathology, however, is obstruction to or interference with fluid circulation by some mechanical condition. Mechanical therapeutics can take any of these conditions and so alter the circulation of the blood as to tend to restore towards normal. For example, in gangrene the circulation is cut off, either partially or completely. If partially, the tissue retains its relation to the other tissues; if completely the tissue is separated in circulation from the other tissues and this means death. If we get the condition in the hyperphysiological stage we can prevent its further development and restore it towards the normal, provided it has not passed the stage of congestion.

If we do not get it before it passes into the third stage, when physical and chemical changes are taking place, it may be difficult, and even impossible, to restore towards the normal. This explains how it is possible to abort a disease in any one of the first two stages. Most writers claim that when the disease is started it must go through its cycle of changes. If we can get the condition, however, before there is any morbid anatomy change we can prevent it from passing through the complete cycle changes.

II. Mechanical therapeutics can strengthen and tone up the muscle fiber. The muscle fiber contains solid and fluid elements. Here we are concerned principally with the fluid part because it can be stimulated or inhibited. By so doing we can affect the nerve fiber and also the blood. This will produce a change in the tonicity of the muscle tissue. The tonic state of a muscle represents the meeting together of the nerve and blood impulses within the muscle fiber so as to maintain the normal action and the reaction of the muscle fiber. The strongest method of reaching the muscle fiber is by vibration because that appeals directly to the fluid part of the fiber. It also appeals to the nerve impulses because the nature of the nerve force is vibratile. The purpose of the vibration here is corrective. In modifying the fluid the blood is modified and this will change the muscle fiber through its nutritive side. Hence if we can build up the nutrition of the muscle and strengthen the nerve impulses this will increase the tone of the muscle.

III. Mechanical therapeutics can produce absorption and resorption. Normally absorption takes place: (a) In connection with the fluids of the body, for example, the digestive fluids and the semi-fluids digested food. (b) In connection with the gasses, for example, internal and external respiration is oxygenation, that is, the taking of oxygen into the blood and this takes place in the lungs. Internal respiration is the change in the tissues sometimes called tissue respiration. Absorption takes place abnormally in the accumulation of fluids and gasses; in stasis, congestion and in dropsy we get an abnormal absorption of the fluid.

Resorption takes place normally in connection with the nutritive processes of selection; abnormally in the accumulation of abnormal fluids and gasses in the tissues of the body. When we have stasis, inflammation, degeneration, congestion, dead tissue substance resulting in a resultant of resorption—blood poisoning. A common illustration of resorption is in headache following aggravated constipation, the absorption of the fecal toxin taking place through the abdominal wall to the blood to be carried to the brain. To relieve this intoxication, remove this by improving the circulation of the blood.

These points apply particularly to the blood and lymph because these are the two great fluids of the body. Absorption takes place chiefly in connection with the lymph. Resorption takes place chiefly in connection with the blood. Absorption and resorption both take place physically and physiologically, physically in connection with the process of osmosis, the osmosis taking place through the interstices of the tissue substance; physiologically by exudation and what is called secretory absorption. The difference between cellular exudation and cellular absorption is that there is always a special channel, either a duct or membrane in the secretory absorption. In cellular exudation there is no organ, the cell exudes out of itself into the blood or lymph.

These processes can be modified by mechanical treatment on account of a possible modification: (a) In the circulation of the fluid; (b) in the pressure of the blood within the circulating medium, lymph or

blood or vessel walls; (c) By the modification of the gravity of the fluid in the particular part involved or in other parts of the body; (d) In modification of gases, mechanical treatment altering the gas in connection with the law of partial pressure.

In human physiology we deal with two or more gases, each gas having its own pressure in proportion to its volume. The law of partial pressure is as follows: In the sum total of pressure exerted by a number of gases in combination, each gas has its own pressure corresponding to its own volume (Boyle's Law). There are two main gases in the body, namely, oxygen and carbon dioxide; the law is that the interchange takes place according to the volume of the gas, for example, if there is a greater volume of CO<sub>2</sub> in the blood the CO<sub>2</sub> will tend to pass out of the blood. Deep breathing exercise is of value to the blood chiefly because it tends to increase the volume of oxygen and this gives a greater absorption of oxygen by the lungs and by the tissues.

IV. Mechanical therapeutics can release adhesions and break up vegetations and growths. For example, adhesions can be released: (a) by freeing the fluid circulation so as to establish perfect drainage; (b) This can be assisted by the application of dry heat, for example, the hot water bottle rolled in flannel, also the bran or sawdust bag in severe cases. When no other method is applicable we can use electricity to develop the heat (use dry heat for adhesions.)

Vegetations are the result of the accumulation of substances. The accumulation of waste matter always precedes an abnormal growth and the growth may take one of two forms, organized or unorganized. The unorganized accumulation is simply an accumulation of blood in the clotted or coagulated form. The organized form is that form in which the accumulation becomes a regular growth, for example, an aneurism in which the blood clot becomes a new tissue substance having its own nerve and blood supplies.

Carcinoma is an organized growth. Here we have a substance which seems to have roots growing down and embedding themselves in the tissues. An adenoid is also an organized growth like a vegetable growing in the tissues, e. g. the mucous membrane. It generally starts in a localized catarrh in the posterior nares or back part of the mouth, an obstructive condition of blood resulting in the growth. The average vegetation is an accumulation of waste following which there is a growth. In many cases there is development as well as growth. This is typical, especially in cancer. Cancer must have a starting point and the consensus of opinion is that the starting point of all cancers is in the embryonic cell. Then there is the accumulation around the center, followed by development. One remarkable demonstration of this is found in the fact that one of the causes of the origin of cancer may be traced to the eating of raw eggs, the germinal vesicle in the raw egg being capable of implanting itself in the tissues and becoming an embryonic cell around which accumulation will take place.

Vegetation is (1) A growth starting from an accumulation around a nucleus, either native or implanted. Resulting from and surrounding this nuclear center there is an accumulation of waste and the toxic elements of the system around it. (2) There is a growth and development following organization. Here we use both growth and development because there is seldom, if ever, any abnormal growth in which we do not find the accumulation of waste matter. It is this accumulation that becomes organized; hence there is growth at the same time, or two processes are going on at the same time, (a) the accumulation of waste, and (b) the assimilation of that waste into the new growth, so that the tissues become vitiated.

An adenoid growth is a vegetation found in the nasal cavity or in

the naso-pharyngeal field, always secondary to some involvement of the mucous membrane. Tumors of different kinds are also simply accumulations, like the fibroid tumor, or like the accumulation surrounding the embryonic cell as the local point of origin of the vegetation. This is simply the field in which the growth takes place by the accumulation of waste matter and subsequent organization. There are many exciting causes, for example, the most common is traumatism, causing the lowering of the vitality of the surrounding cells and allowing the embryonic center to develop at the expense of the depleted cells.

Among the other exciting causes are: Live salts, found in excess in hard water. Starch and sugar, used in excess, causing fermentative changes in the tissues. This is probably the most common cause. As a proof of this we find that one of the first things that takes place when we try to break down a growth is the emission of enormous quantities of gas. The curable condition depends entirely on the ability of the system to eliminate these gases. The gases are stored in a latent form in sugar or starch.

In these two forms of abnormal growths- organized and unorganized- the method of treatment would be entirely different. The simplest unorganized growth is a blood clot. Other illustrations are fibroid, sarcoma, in which there is a wall in the form of a sac and the sac is filled with waste elements. In these cases the eliminations are to be eliminated directly through the blood and the treatment is the process of elimination. The same is true of goitre. Simple goitre is an accumulation of intoricated blood in the thyroid gland or in a cystic sac, as an appendage to the thyroid gland. The starting point of the majority of the latter cases is to be found in suppressed menstruation and treatment will be directed to the removal of the suppressed menstrual condition and the correction of what caused it. The method of treatment here is to reestablish the condition that was altered at the starting point of the goitre.

The organized growth is next represented by the carcinoma. Here there is a mass of accumulated waste gathered around the center becoming an independent tissue or organ which then develops as an organic substance. We often hear it said that cancer is a malignant growth. It is not any more malignant, however, than any other growth. The reason it is fatal in so many cases is that it is a newly implanted life within the life of the body and it is malignant in the sense that it eats away and destroys the vitality of the body. The roots of a cancer, so-called, are really suckers. They go down into the tissues to suck out the blood that really belongs to the normal tissues. The treatment of cancer may be divided into three lines, both of which require to be followed out very carefully: (1) Eliminate, or cause to be eliminated the accumulating and the accumulated toxins that form the exciting cause of the cancer; (2) Shut off the healthy blood from the abnormal growth by reestablishing the normal tissue development; (3) Correct the lesions that have made possible such a growth, as these lesions have appeared in the life history.

This differentiates the treatment of cancer from goitre, viz., that it is not primarily the elimination that we are after but it is the isolation of the growth so that it will not draw any longer on the food supply; secondarily, eliminating the poisons and wastes. One of the common causes of cancer at the present day is the use of patent medicines. Here we have alcoholic infusions of poisons taken into the system.

In taking the history of a cancer patient we require to take the list of poisons taken during life. If not, you can get a sample of these in the eliminations when the cancer begins to be broken up. If we find



people who have not taken toxic substances so there is no toxic foundation for the abnormal growth, these people are easily cured of the abnormal growth, because there is left simply the toxins of metabolism and digestion, with the lesions these represent, to correct or remove.

V. Mechanical therapeutics can increase the oxidizing power of the blood by the proper manipulation of the nerves that control the blood circulation and the stimulation of the normal action of the respiratory apparatus, for example, by raising the ribs and raising and expanding the thorax which loosens up the upper part of the thorax, allowing a larger field in the lungs for oxidation (oxygenation). If the upper part of the thorax is filled the lower part of it will take care of itself. In deep breathing the point we want to get is the expansion of the upper part of the thorax; the lower part will look after itself if the upper part is attended to, for both physical and physiological reasons.

(1) Physically The upper part of the thorax is most rigid, the first two ribs being the base of movement for all the rest of the ribs. These first two ribs are practically immovable so that when the ribs are solidified they will remain in that solidified condition, in which case we must use absolute force to get them into movement again.

(2) Physiologically: The upper lobes of the lungs, both right and left are the portions least supplied with blood and these are the portions that most need it if we wish to get results. It is at these points that tuberculosis most frequently attacks the lungs.

Underlying oxidation is oxygenation, that is, the process of supplying oxygen to the blood through the lungs. Oxygenation implies: (1) The union of oxygen with haemoglobin in connection with the red blood corpuscles; (2) also absorption of oxyhaemoglobin into the subcutaneous tissue or fascia field.

Oxygenation, therefore, has three distinct fields: (1) The lungs, (2) the red blood corpuscles, and (3) The fascia.

In stimulating oxygenation we stimulate any one or all of these fields. The fascia is more easily stimulated because it is nearer the surface. The lungs and red blood corpuscles can be affected only indirectly, since people cannot take deep breathing, hence they cannot create a vacuum in the fascia for oxygen. One 250th part of oxygen in respiration is found in connection with the skin, as compared with the lungs.

Oxidation is the process of combustion, representing the union of oxygen with carbon, hydrogen and nitrogen, the elements that are supplied as fuel. The fields in which oxidation takes place are: (1) The liver, representing the largest field. Although the liver is a small organ relatively, the greatest metabolism in the body is in the liver. This is the reason why overeating has such a bad effect on the liver because the more we eat the more work is thrown upon the liver. Hence, the liver is an overworked and abused organ. (2) The muscles. Although the muscles are some hundred times the size of the liver, yet they do not do 1/100th part of the work of the liver. (3) Glands of the body. These are particularly active in connection with wastes or excess of food, which explains why the glands become cancerous. These are the three fields of oxidation—the liver, the muscles and the glands.

Blood purification takes place not only in the lungs but also in the liver. The liver is more active in many ways than the lungs because the lungs purify the blood of the gas elements while the liver purifies the blood from poisonous substances of all kinds. The muscles are to be placed side by side with the fascia, muscle and fascia being interrelated, the fascia for oxygenation, the muscles for oxidation.

Elimination takes place from the upper part of the trachea or pulmonary side.

In blood purification we also include the kidneys in relation to solid. In the production of the red blood corpuscles the formation is progressive. They are not formed in any one organ, each organ contributes its share UNTIL THE RED BLOOD CORPUSCLES ARE formed. The red blood corpuscles may break down in the blood stream but this is unusual. Under normal conditions the red blood corpuscle breaks down in the spleen, the spleen being called by some of the physiologists the "Grave Yard" of the red blood corpuscles. Properly speaking the red blood corpuscle is the body of the white corpuscle. The nucleus part of the white corpuscle goes to form the blood plate (platelet). The fat element in the white cell is taken out from the corpuscle, the fat becomes the granule, the remainder of the corpus is nitrogenous substance. This is pigmented in the red marrow of the bones and becomes the red blood corpuscle. The blood, therefore, passes through a regular cycle of changes, the same as the other tissues of the body. The life of the white cell being the life of blood as a tissue and that life is from twenty-one to twenty-eight days. This explains the menstrual period.

In regard to changes through which the corpuscles pass: The red corpuscles pass through much more rapid processes than the white. In stimulating oxidation we can stimulate through any one of these fields, namely, the liver, the muscles, and the glands. If you wish to stimulate strongly use the liver because that is the largest field of metabolism. The minimum field is: the glands. In some cases to stimulate the maximum of oxidation would combust the patient. In this case it is of advantage to use the glands. The muscular field is particularly appreciable in rheumatism of the muscular type, also in most of the constitutional diseases. The rheumatism we deal with both oxidation and oxygenation, the former chiefly through the liver and muscles, the latter through the lungs. One of the chief causes of rheumatism is the involvement of the liver and where this is so the only way to relieve the condition is to treat the oxidation process through the liver.

In anemia we have a constitutional disease associated with a similar condition. In this case the cause is to be traced to the lungs, fascia or red blood corpuscles, hence anemia is a disease that affects principally oxygenation. The two, oxidation and oxygenation are closely related, a defect in one causing a defect in the other. This is the basis of the osteopathic treatment in anemia. Instead of giving iron or a tonic, we give a tonic treatment (a) to the blood, (b) the fascia, and (c) the lungs.

VI. Mechanical therapeutics can relieve congestive conditions. Congestion is always a result of a stasis of the blood and the stasis is the result of an obstruction to or interference with the blood circulation, either direct or indirect. Inflammation is a result of congestion, that is, a condition following congestion in which chemical and physical changes are established, including the accumulation of heat.

Stasis, inflammation and congestion, from the physiological side, mean a vasomotor disturbance, the result of the disturbance being the dilation of the blood vessels and the enlargement of the field in which the blood circulates, that is, in the tissue or organ involved in the stasis, congestion and inflammation.

The vasomotor system is that particular portion of the nervous system that supplies the muscles of the blood vessel walls, found chiefly in the arterioles. To relieve this vasomotor condition localized in one particular organ or tissue we produce a vasomotor dilation at some other point. This is the physiological application of the counter action, opening up a

new arterial field in order to relieve the static or congested condition of some local area. In applying this treatment several points must be noted:

(1) Stimulate the general superficial circulation at 4th and 5th dorsal by relaxing the muscles and articulating the vertebrae, the rhythm of the heart together with the cardiac end of the stomach and the rhythm of the lungs being influenced by the treatment, tending to co-ordinate these organs.

(2) Stimulate the entire vaso-motor system, for the entire body along the anterior transverse processes of the 2nd, 3rd and 4th cervical vertebrae, reaching the general vaso-motor system through the superior cervical ganglion. In giving this treatment locate the pulsating carotid, then press backward against the processes. In this case give moving pressure.

(3) Treat the great splanchnic area from 5th to 10th dorsal by strong inhibition. This is the region of the mesenteric blood supply, representing the largest blood field in the body. That is the reason it is treated, because when the congested condition is in any other part of the body you want to pull the blood from that part to this field. To open the mesenteric blood field inhibit; to close it, stimulate, stimulate by moving pressure.

(4) After opening up the abdominal blood field, treat from the region in the spine representing the special local congestion towards this splanchnic. This will be different in different cases, for example, (a) in case of congestion of the head (a congestive headache) the treatment will be from the occiput to the 4th and 5th dorsal (treatment stimulation.) (b) In congestion of the lungs treat from the 4th dorsal down to the 10th dorsal (stimulation); (c) In congestion of the liver treat from the 8th dorsal up to the 5th dorsal and then down to the 10th dorsal; (d) in pelvic congestion treat from the sacrum up to and through the splanchnic region. (Stimulation).

In these treatments, as a general rule, the relaxation of the muscles along the spine in the areas to be treated will be the treatment called for.

(5) In order to prevent the return of the congestion give articulating treatment to the spine in order to establish a thoroughly co-ordinated condition of the circulation: (a) If congestion has been in the head always articulate downward; (b) If congestion has been in the pelvis liver, extremities, always treat upward. This treatment is given to co-ordinate the circulation so that the part which was congested may resume its proper relations in the blood field to the other parts of the body. This fifth point is absolutely essential in dealing with head and pelvic congestions. In other congestions the parts or organs congested will take care of themselves.

(6) Apply inhibition along the spine only when the muscles are contracted, in order to prepare the system for the other treatments.

(7) The blood is regulated throughout the entire body system in two ways: (a) through the internal heart or heart proper. Here we depend on the pumping action of the heart. The heart may be stimulated directly in relation: (1) to the force of the heart at the 3rd and 4th dorsal; (2) to the rhythm of the heart in relation to its beat at the 4th and 5th dorsal; (3) in relation to the acceleration of the functional activities of the heart through the sympathetic system. That means the pumping action of the heart. In this case the heart is treated directly through the middle cervical ganglion-viscero-motor field- of the sympathetics, located from the middle half of the body of the second to the upper half of the body of the fourth cervical vertebrae is the superior cervical ganglion.

The middle cervical ganglion represents the sensory side of the heart via the medulla and spinal accessory nerves, and is located at the fifth and upper part of the sixth cervical, that is, the body or transverse process of the fifth cervical vertebra corresponds with the middle cervical ganglion, just opposite the thyroid gland. This is why we get in goitre heart acceleration. The best place to reach this ganglion is right over the transverse process of the fifth cervical. Place the fingers just behind the carotid, press backward and upward against the transverse process of the sixth cervical vertebra. Some assistance can be rendered to this acceleration by stimulation of the superior cervical ganglion. In this case the effect of the treatment will go from the superior to the middle because the superior is the sensory side.

(b) Through the superficial or peripheral heart representing the small arteriole circulation. This is based on the theory of circulation mentioned before, according to which the starting place of circulation is not in the heart proper but in the peripheral blood system. In this case general stimulation can be applied by superficial, that is, light versus heavy, treatment at the 4th and 5th dorsal. ~~We stated that the treat~~ Before inspeaking of the treatment at the 4th and 5th dorsal of the heart, we stated that the treatment must be deep in order to reach the heart, because to reach the heart the impulse must pass through the pulmonary plexus.

These two hearts work together and at the same time in opposition to one another. This means that possible interference with the action of the one will cause congestion of the other. For example, if the superficial circulation is obstructed there is, or is a tendency to, a cardiac congestion. In this case the heart is overworked on account of the excess of blood drawn into the heart. This excess of blood may tend to stop the heart action; if so, it will stop in diastole. This means that in the treatment of the heart in this case it must be started in diastole. There are, therefore, two sides to the treatment in this case where the heart stops in diastole: (1) Negative. The heart must not be stimulated directly, that is, we must not treat at the fourth and fifth dorsal, at least deeply, nor at the pneumogastric nerve, nor at the fifth cervical, because these are the direct points of the heart. (2) Positive. Treat the heart only indirectly, that is, by dilating the superficial circulation. This can be done best:

(a) by treating the depressor nerve, treatment applied at the inferior cervical ganglion of the sympathetics right over the head of the first rib, the depressor nerve being the afferent side of vaso dilation with the great center in the medulla. (b) follow this by a very light treatment at the fourth and fifth dorsal. Here you are trying to get at the superficial circulation, following the treatment of the depressor which carries the impulses of overwork from the endocardium of the heart to the medulla, there to throw its impulses over to the vaso-motor system. This follows the effect of the vaso-dilators by stimulating the superficial circulation. Here the effect is gained through vaso-motion on the dilator side. This leads up to point No. 8. In treating congestion we require to treat the vaso-motor system.

(8) In treating congestion we require to treat the vaso-motor system which includes, as parts of the vaso-motor system, (a) the great centers located in the medulla on either side of the median line just below the level of the cardio-inhibitory and respiratory centers. This is reached by treatment at the atlas and in the basi-occipital region, in order to reach the fibers that pass up to the medulla, especially from and

through the superior cervical ganglion; (b) by treating the subordinate centers, located in the spinal cord. These supply principally to the vaso-constrictor and dilator centers, the constrictors from the 2nd dorsal to the 2nd lumbar, inclusive. The best treatments to reach the vaso-motor system are as follows: (1) Through the blood in the vertebral artery by inhibition around the atlas and at the articulation of the seventh cervical and first dorsal, that is, the point of junction between the two. Sometimes in giving this treatment too strongly, especially if given suddenly, the patient may faint, if so, restore the patient by articulation at the same points. (2) At the upper end of the superior cervical ganglion apply inhibition, that is, about the level of the middle of the axis so as to catch the fibers from the superior cervical ganglion and also the fibers from the first five posterior spinal nerves as they pass up towards the medulla. Inhibition at this point will cut off all the sensory impulses from the heart to the medulla and from the first five posterior spinal nerves. This is applied in neuralgia or rheumatism of the heart. In angina pectoris this is the best method of checking the pain. This is a palliative treatment.

(3) Treatment of the subordinate vaso-constrictor center located in the anterior horns of the spinal cord from the second dorsal to the second lumbar. The great function of these centers is vasoconstrictor, therefore, stimulating treatment is called for in this case by articulating the vertebrae. It is a spinal cord center, not a brain center that you want to reach by this treatment, the result of the treatment being constriction, increasing the constrictive action of the centers.

(4) To get the dilator effect, which is purely local, treat in the local area of the spine corresponding with the point involved. This includes the cranial nerves, spinal nerves and sacral nerves. (Cranial nerves as well as spinal nerves are dilated. For example, the sacral nerves are dilators to the intestine, to the pelvic organs and the extremities.

For the head, face and eyes we get dilators: (a) from the third to the seventh cranial nerves; (b) in the lower cervical region (spinal nerves). For the throat we get dilator fibers from the sixth cervical to the second dorsal spinal nerves. For the stomach at the sixth and seventh spinal nerves (dorsal.) When two areas (constrictor and dilator) are found at the same point give a light treatment to get the dilator effect. Strong articulating treatment to get the constrictor effect. The constrictors control the tonic condition, therefore, normally, the constrictors are nerve open pathways, that is, the pathway of least resistance. Normally the dilators are always open pathways, therefore more easily aroused. They are easily aroused but difficult to control or settle again.

VII. Mechanical therapeutics can control the secretory functions. Secretion is a function that depends upon the interaction of, and is the net resultant of united action on the part of the two nervous systems, that is, we have the interaction and united action of the cerebro-spinal and the sympathetic nervous systems. The cerebro-spinal controls the fluid or limpid part of the secretion; the sympathetic controls the solid part of the secretion.

In general the main or predominant secretory effect is produced through the sympathetic system in all secretions, except in connection with the salivary system. In the salivary secretion we have distinct glands, for example, the parotid gland has to do with the watery secretion; the submaxillary, sublingual, laryngeal, etc. have to do with the solid (mucous) secretion. The cerebro-spinal control of the salivary secre-

tion takes place through the chorda tympani, a branch of the seventh cranial nerve. The chorda tympani ramifies with the 5th cranial nerve through the ganglia on the fifth cranial nerve, so that the chorda tympani as secretory fibers really operates as a ramification of the fifth and seventh cranial nerves.

The submaxillary gland is one of the mixed glands, but it does not supply a watery secretion, it supplies water only as a part of the mucoid secretion.

In order to treat the chorda tympani treat: (a) directly over the parotid gland, except in case of mumps; (b) at the inferior angle of the jaw, pushing the fingers well up under and behind the inferior maxillary.

The sympathetic center of salivation is located in the upper dorsal in relation to the upper thoracic sympathetics. The best point at which to treat is at the second and third dorsal, in relation to the heads of the ribs, (a) for stimulation by articulation at the heads of the ribs, (b) for inhibition apply direct pressure inward and upward over the heads of the ribs at the corresponding vertebrae. The sympathetics lie latero-anterior in relation to the spinal column.

(c) The sympathetic system can also be reached for salivation through the superior cervical ganglion, because all the sympathetic fibers pass upward along the chain before their distribution to the salivary glands. The best treatment to reach the secreting function is to inhibit or stimulate the sympathetics directly (stimulate to increase; inhibit to decrease), because the sympathetics control the solid secretion, the solid being the true secretory substance.

(d) In connection with secretion we can also stimulate directly the unstriated muscle in order to reach the blood vessel system or the viscera. In this case the sympathetics also control, control taking place from the regional sympathetic ganglia. This means that if we are dealing with the unstriated muscle to the salivary system the point of treatment will be located in the upper cervical region.

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## VASO - MOTION .

The body organism is an organized community of cells. This community of cells becomes differentiated in connection with specialized activities. The cell is the unit of organization, the cell representing the simplest proximate combination of living matter. There is a unit of vitality in connection with the cell development and the cell processes of repair and regeneration. This unite of vitality consists of the bioplasts or small masses of naked matter found at the basis of the cell constitution.

### NERVOUS SYSTEM CO-ORDINATION.

When cells are combined, both structurally and functionally, they are intimately correlated. This means that there is harmony, order and adjustment- the cell community. In order to maintain the completeness of the cell organization, certain groups of the cells are differentiated as the medium of communication, the center of organization and the field of co-ordination, co-operation and harmony. This differentiation of cells gives origin to the nervous system, the master tissue structure of the organism. The nervous system represents in the most perfect way possible the highest development of organization and especially acts as the great center for the nutritive processes in connection with the separate cell units. In the general development of the cells we find first in the order of development the cells that are essential for nutrition, the rest of the cells depending upon those primary cells for their organization and nutritive development. In these we find also the most highly refined type of evolution, the culmination of nutritive development, and consequently the higher classes of activity. In these functioning is most perfect.

In the evolution of the nervous system we have the formation of that tissue structure which performs the function of communication between all the other tissue and cell elements of the organism. Communication and interchange are the great services rendered by the nervous system in connection with the vital phenomena.

### VASO-MOTOR MECHANISM PRIMARY.

In the development of this nervous system we find that the vaso-motor apparatus appears as the first completed nerve mechanism. This mechanism lies at the foundation of the nutrition of the organism through the blood circulation and makes possible the most perfectly developed structure and the most delicate functional activities. Very early in embryonic development the original migratory neuroblasts settle down, the first settlement taking place in the cervical region which leads all the later development. Very soon we find in the region extending from the second dorsal to the second lumbar certain neuroenic cells in connection with the anterior horns of the spinal cord which exert a tonic or constrictor function over the walls of the arteries. This settlement long antedates the existence of the medulla, <sup>and, therefore,</sup> the medulla occupies the same relation to vaso-motion that the brain does to the spine, namely, con-

striction. By this function a partial constriction of these muscle wall coatings in the arteries is preserved and in this way the balance of the circulation of the blood is maintained. The proper distribution of the blood through the entire organism is dependent on this functional process of arterial tone—the arterial tone co-ordinating the arterial and venous blood systems and co-operating with heart force in maintaining the steady and uniform circulation of the blood.

In the further development of the nervous system, as the visceral activities come to be brought into subordination to and under the regulation of the cerebral and cerebro-spinal systems, another series of neuronic cells more limited in numbers is found in the same region of the spine and more numerous distributed in the medulla, cervical and dorsal regions. These cells have as their function, the inhibition of constriction, or of arterial tone, resulting in the relaxation of the muscular wall coatings in the arterial system. These are neurones which represent dilation. This nervous functioning is not constant like the constrictor functioning and represents the localized increase in the local circulation, especially for nutritive and oxidatich purposes.

#### VASO-CONSTRICTION AND DILATION.

These two sets of neurones represent respectively, (a) Vaso-constriction producing and preserving the arterial tone, and acting constantly; (b) vaso-dilation, acting only as occasion and the needs of local tissues demand, this demand representing, (1) the increased functional activity of the parts involved, from the visceromotor side, that is, vasomotion is the stimulus to visceromotion; (2) the nutritive necessities of the tissues, and (3) the protection of the tissues from intoxication, congestion, morbid changes and the action of different forms of germ life. The dilator system then represents an emergency activity which nature may call into operation to protect the organism or its parts from disintegrating conditions and build up or repair wasting conditions. This system is always at the call of our manipulative treatment. Being located along the entire length of the spine and especially in segmental lesions they are accessible for specific treatment or correction of lesions in specially involved areas. Therefore the rhythmic relation between vaso-constriction and vaso-dilation is practically the foundation of all functional activities.

#### MEDULLA VASO-MOTOR CENTER.

In the medulla, which represents the summation of centers in connection with the vital processes, we find a center consisting of a series of neurones, on either side of the median line, whose function is to act as the great controlling vaso-motor center, regulating the regional vaso-motor cell groups in the spinal cord. This center controls specially the tonic state of the arterial system acting on an automatic basis as the regulating mechanism. Down below this mechanism reflex action may modify the vaso-motor tone, the impulses passing from some peripheral point inward towards the reflex centers in the cord. For example, the mechanical irritation of the skin may produce under different conditions of application, (a) a reflex vaso-constriction, or (b) a reflex vaso-dilation. Vaso-motor tone may be modified, then, from the sensory side of the nerve apparatus. This modification may take place, (a) through the medium of the depressor nerve which, as a sensory nerve, originates in the heart, communicating with the medulla along the pneumogastric nerve trunk and



modifying the medulla vaso-motor center. The question is, what is the sensory side of the vaso-motor apparatus? The depressor nerve. This action lessens peripheral resistance in the capillaries, causing arterial dilation and specially relieving an over-worked or overfilled heart. (b) Sense-constrictor- visceromotor fibers originate in the tissues, and (c) sense-dilator fibers co-operate with the general sensory fibers in carrying impulses to the vaso-motor center in the medulla and the centers in the spine expressing the needs of the local tissues or the condition produced by artificial stimuli upon the skin or over the peripheral portions of the organism.

#### THE SENSE-VASO-MOTOR MECHANISM.

All these changes depend upon environmental conditions. In fact, the senso-motor system represents a mechanism that picks up and reports the surrounding conditions of the organism, such as temperature, pressure, muscular rigidity, structural modification, involving the bones, muscles, ligaments and organs. The vaso-motor mechanism is most profoundly affected by these changed conditions, because upon it depend the functional variations of the blood system in every part of the body. This is the reason why so many diseases are vaso-motor in their origin and associated with spinal disturbances of various kinds.

This is specially true around the spine. Variations in the pressure upon the nerves constituting the vaso-motor mechanism produce varying effects. For example, physiology has demonstrated that light pressure if repeated at short intervals arouses the constrictor side, whereas deep and continued pressure arouses the dilatory side of the blood vessels.

#### ANTAGONISTIC COMPENSATORY CORRELATIONS.

Physiology has also demonstrated the existence of antagonistic compensatory relations between the blood vessels of the body trunk and the internal viscera. This is based upon Head's Law applied to the circulation, the communication between the two points being established through the central nervous system. This is the basis of the reflex senso-motor vaso-motor mechanism.

Physiology has also shown that a similar relation exists between the circulation of the spinal cord and the superficial spinous muscles. These spinous muscles are supplied sensorially by the posterior primary branches of the spinal nerves which supply all the structures superficial to the cord, namely, the vertebrae, muscles and skin. According to this arrangement of the body mechanism this senso-motor vaso-motor mechanism binds together in correlation, (a) the viscera internal and the entire wall of the body trunk external; and (b) the spinal cord and meninges and the entire structures around the cord, including the column, the muscles, the ligaments, fascia and skin, and the three deep layers of spinous muscles. The correlation of these co-ordinates internal life and life processes with external conditions, (a) in the structure of the wall of the body cavity, the spinal vertebrae, and soft tissues, and (b) in the environment and environing conditions of the body organism where this correlation is disturbed by any deflection from normal in any of the constituents of this correlation, we find what is commonly called a lesion with resultant disease conditions and morbid states or changes.

### PRACTICAL APPLICATION OF CORRELATION.

The allopathic principle of counteraction or irritation illustrates this principle. A blister locally and superficially applied induces peripheral dilation relieving deep congestion. On the same principle mechanical stimulation applied to the vertebrae, muscles or skin supplied by the posterior primary branches of the spinal nerves reflexly acts upon the spinal cord modifying the circulation of the cord. If this takes the form of a lesion, such as a contracted muscle, tense ligament, displaced vertebrae, the mechanical pressure acts as an irritant or obstruction destroying the co-ordination between the internal and deep parts of the organism. The correction of the disturbed condition restores the co-ordination. In cases of inco-ordinate functioning (a) the continued application of light mechanical pressure appeals reflexly to the dilator mechanism, whereas (b) the frequently repeated application of light mechanical pressure appeals reflexly to the constrictor mechanism. The result of this is, (a) steady pressure, manual or digital along the spine, causes the dilation of the blood vessels in the vertebrae, muscles, fascia and skin supplied by the posterior primary branches of the spinal nerves, reflexly constricting the blood vessels of the spinal cord, diminishing the blood supply to the centers within the spinal cord; (b) The continued light moving pressure, manual or digital, along the spine, causes a constriction of the blood vessels in the vertebrae, muscles, fascia and skin supplied by the posterior primary branches of the spinal nerves and reflexly produces dilation of the blood vessels within the cord, increasing the blood supply to the spinal centers, increasing the nutrition of these spinal cells and normalizing their functions.

### CONTRAST OF ACUTE AND CHRONIC DISEASE CONDITIONS.

In the chronic diseases we find the prevalence of an anemic state of the blood supply to the cord cells, whereas in the acute diseases and acute manifestations of chronic conditions there is hyperaemia and congestion of the spinal cord cells. In the former case this means lack of nutrition and a state of partial starvation; in the latter case dilation of the blood vessels with the tendency to stasis and venous stagnation. In the application of treatment where anemia exists moving pressure in the neighborhood of the spinal cord involved, and where hyperaemia exists steady pressure in the involved area tends to normalize the blood supply and restore the normal functioning of the spinal cord cells. This is a fact of physiological mechanics. Why? Because it is the function of vaso-motion to establish this co-ordination.

### NERVOUS SYSTEM IN RELATION TO DISEASES.

All pathological conditions of perverted functioning or morbid changes depend upon a pre-existing derangement of the nerve mechanism or particular parts of the nervous system. This means that if the organism is normal, the nervous mechanism is intact, if it is abnormal the nervous mechanism is disturbed. To restore the abnormal to the normal we must get at the real cause of the disorder or disturbance in connection with the nervous system. The principal portion of the nervous system in relation to the causation of disease is the vaso-motor mechanism as this mechanism is closely associated with the blood in its distribution over the entire organism.

In dealing with this nervous system as the center of all vitality and the medium of all the vital processes, we must give proper place to external conditions in and around the organism that produces obstructions of the nerve forces. This lies primarily in the structural parts of the organism itself, especially the bones, muscles and ligaments; secondarily, in all environmental conditions that are associated in any way with the individual life, particularly during the period of growth and development when the tissues are plastic and liable to all kinds of impressions from without. The therapeutic means to be used in such cases must include the correction of such conditions and the removal of obstructions, so that nature may be free to restore to the normal.

#### VASO-MOTOR SYSTEM IN CORRELATION.

The vaso-motor nervous system is one of the important means of correlation of the functional activities. The vaso-motor nervous system is one of the first parts of the nervous system to be formed. The formation takes place in connection with the settlement of certain cells in the spinal canal from the second dorsal to the second lumbar vertebrae. These cells send out nerve fibers which lie at the basis of the tonic state of the entire blood vessel system. The stimulation of the vaso-motors gives tone not only to the blood vessels but acts as a tonic to the entire tissue organism. Primarily the vaso-motor nerves are distributed to the blood vessel walls; secondarily the tissues are affected through the blood vessels.

There are two sets of these vaso-motors, viz: (a) those that are stimulating in function, called constrictors; (b) those that are inhibitory in function, called dilators. The muscles in the blood vessel walls are kept in tone directly through these, and indirectly they react upon the muscles throughout the entire body. This gives us the most complex and widely distributed nervous system, with a uniform function, namely, to maintain tone in the entire organism.

#### TONIC TREATMENT.

The best tonic, consequently, is a vaso-motor treatment. This vaso-motor treatment consists primarily in the thorough relaxation of all the muscles along the spine and is an inhibitory treatment. The muscles along the spine when contracted disturb the functioning the vaso-motor nerves and produce contraction of the peripheral blood vessels, resulting in the increased peripheral blood resistance in the small arterial circulation. This means that the small arteries in the spinal cord, and through them, the spinal muscles become tense and contracted. This tension causes resistance. The principle of this treatment is the application of Head's law as applied to the blood. Superficial anemia implies deep hyperaemia and vice versa. Hence if there is hyperaemia along the spine in the spinal muscles there is hyperaemia in the spinal cord. Either condition will affect the spinal centers. In the one case hyperaemia produces a congestion of these centers resulting in the inhibition of the action of the centers. Anemia, on the other hand, acts as an irritant to the spinal cord centers, because the anemic blood is venous and the strongest irritant is venous blood.

VASO-MOTOR TREATMENT AFFECTS BLOOD.

In correcting the correlation of the blood supplies in the muscles and the spinal cord we restore the normal function of the nerve centers bringing back to normal the nerve supply to the different organs and muscles. This is based on the fact that each organ and muscle is supplied with vaso-motor nerves from the spine through the blood vessels. All tissues and organs have this supply and action. The stimulation of the spinal cord centers depends primarily upon the blood. The aeration or non-aeration of the blood represents the stimulus. (Stimulus here includes both acceleration and inhibition.)

In the one case non-aerated blood acts as an irritant, exciting and accelerating the normal function of the nerve and sometimes making it abnormal. Aerated blood, if it is in excess, acts as an inhibitor because it produces congestion and stasis. This means that osteopathic treatment aims at changing the condition or quality of the blood, so as to make the blood act as a normal stimulus, either inhibitor or accelerator as the case demands, to the nervous system. This means that the spine, including the spinal cord and the spinal column, represents the great field of centers in connection with the origin of disease or the expression of disease and also its treatment. The physical act of manipulation is converted into the physiological condition represented by the blood and the nervous system. Through the blood and the nervous system this physiological condition acts and reacts upon the entire body organism. This is the reason why the spine is the great objective point of treatment, because the spine is the great center of origin or center of expression of all diseases. Such a center must be the point for the application of corrective, stimulating or inhibitory treatment.

I. One of the best ways to discuss vaso-motion is from the circulation side. Vaso-motion is the stimulus to circulation and also the key to the circulation. On the side of the circulation there are two factors to be taken account of.

1st: The heart- the heart has its own inherent rhythm. This is a muscular phenomenon controlled entirely through the cardiac plexus. The way to reach the cardiac plexus is through the spinal nerves at the third, fourth and fifth dorsal, giving strong treatment in order to reach this plexus. To reach the pulmonary plexus the more superficial treatment the better, but to reach the cardiac through the pulmonary requires very strong treatment (articulation.)

2nd: The heart as an organ is regulated rhythmically by the nervous system on the two sides: (a) Inhibitory action depends on the continued action of the tenth cranial nerve functioning through the cardio-inhibitory center in the medulla. NOTE- That the normal cardio-inhibitory center is regulated by arterial blood pressure all over the body- vaso-motor. (b) Emergency inhibitory act depends upon the depressor nerve. Normally this nerve acts by stimulus from the endocardium and the upper part of the thoracic aorta. The depressor being a sensory nerve, picking up stimuli from an over or under-worked heart. Note that point particularly, that is the only condition under which the depressor is brought into play, particularly in relation to the amount of blood that is being received and thrown out from the heart. For treatment in case of emergency the depressor nerve can be reached at the head of the first rib where it passes into the trunk of the tenth nerve at the Annulus of Vieussens; and, remember, in dealing with the depressor nerve that it is always by stimulation because it does not make any difference whether the heart is over-

worked or underworked. Articulation at the head of the rib, very strong kneading and vibration to stir up the tissues. The strongest treatment that can be given for stimulation is what is required. Remember that the depressor is a right side nerve so far as the heart is concerned, that is, you do not require to treat the left side. Note also that the center for the depressor nerve is in the medulla and its functions peripherally from the medulla through the vaso-motor system, so to accentuate this treatment articulate from the second dorsal to the second lumbar.

(c) The accelerator center is also located in the medulla, the neuraxons from the cells passing down along the pyramids and the cord as efferent fibers to the upper dorsal area where a connection is established: 1st: With fibers passing through the spinal cells of the sympathetic ganglia to the first, second and third dorsal ganglia and thence to the heart. 2nd: Terminating in the spinal cells and passing out as new spinal fibers (cerebro-spinal) to the heart (cardiac plexus). This center acts under the stimulus normally of normal peripheral resistance, that is, the body is the stimulus of the action of the heart. Primary stimulation-tension in capillaries (blood), secondary stimulus-tension in the arterioles (nerve). To increase the stimulus of acceleration to the heart, increase the tension of the capillaries and vice versa, for example, hydrotherapeutics would make use of a hot or cold pack. TREATMENT. At the first, second and third dorsal vertebrae, stimulation to increase acceleration-inhibition to decrease. Inhibition here because we have fibers that are going out and moreover fibers that are going out through the spine.

(d) We also get motor acceleration of the heart through the middle cervical ganglion of the sympathetic. This is a distinctively sympathetic function that has reference to visceromotion, that is, the rhythmic acceleration side corresponds with sympathetic inhibition through the inferior cervical ganglion. Middle cervical ganglion opposite the fourth and fifth cervical transverse processes. Inferior cervical ganglion opposite sixth and seventh cervical transverse processes. To give a rhythmic treatment to the heart alternately treat by stimulation the middle and inferior cervical ganglia. Spinal side of visceromotion in relation to the heart-splanchnic-greater and lesser.

II. The internal blood supply to the heart-coronary circulation. This is also active in regulating heart action, for example, increased blood in the coronary circulation increases the nutrition and makes the heart beat faster and stronger, that is, accelerates the heart. This may be regulated in a number of ways, particularly: (a) By direct treatment of the abdominal aorta to check the flow of the blood temporarily, for example, apply direct pressure on the abdominal aorta; that will throw the blood back by regurgitation onto the valve and physiology teaches that it is in this manner that coronary circulation is established. This is a treatment that can be applied with great benefit in cases of weak heart if given very gently. It is very effective where you cannot get a vaso-motor effect, especially in old people and in febrile states. This is the treatment that takes place in strychnine- (1) inhibition over abdominal aorta and (2) articulation at second dorsal to second lumbar.

(b) Normally, this circulation depends on the vaso-dilation of the coronary arteries. The vaso-motor fibers that control these coronaries originate from the third, fourth and fifth dorsal, therefore in treatment:-

(1) If the heart is subject to oppression, spasm or obstruction (angina pectoris, for example, epilepsy or a like condition) inhibitory treatment gradually increasing the force of the inhibition at the third, fourth and fifth dorsal will gradually dilate the coronaries and gradually

increase the action of the heart.

(2) Stimulation at the same area will constrict the coronaries and tend to lessen the action of the heart. (This is valuable in apoplexy where the heart is running away with itself). Note these two points as they are extremely valuable, an hundred times more so that Digitalis or Nitro-glycerine, without giving any extra effect on the muscles of the heart. (Strychnine is a muscle medicine.)

(3) The pneumogastric is a vaso-motor nerve cerebro-spinally to the coronary arteries. This explains the relation of the pneumogastric to the third, fourth and fifth dorsal, via the sympathetic ganglia at the third fourth and fifth dorsal. It communicates through the medulla down to that point and a spinal nerve there picks up the impulse and carries it out to the heart. You can therefore get a vaso-motor effect on the coronary arteries by stimulation of the pneumogastric nerve at any point.

III. The controlling centers of the heart act chiefly in connection with peripheral tension of the blood vessels, that is, the minute arterioles- peripheral heart. This peripheral tension, when normal, regulates the heart through the accelerator function. The significance of that is a point that is not appreciated by many; it is this: that acceleration predominates in the normal heart. I do not mean that the heart works rapidly but this is explained by the cycle of contraction, relaxation and rest, with contraction in excess. When the heart is abnormal the inhibitory function enters in as an corrective agent or factor. The balance wheel of the heart and circulation is: (a) The Pneumogastric nerve, and that includes all of its apparti; (b) The Depressor Nerve.

TENSION (Arterioles) acts as follows: When the pressure in the arteries rises the pressure of the blood in the heart also rises and this pressure stimulates the terminals of the depressor nerve in the cardiac walls, endocardium and in the aorta. The depressor nerve then carries the stimulus to the cardio-inhibitory center in the medulla, along the depressor path which is sensory; the impulse correction then is radiated to the vaso-motor center in the medulla as an inhibition and is passed out to the periphery along the vaso-motor system with the effect: (a) lessened pressure. That is a point that I do not think physiology has presented up to the present. (b) Diminishing arterial peripheral resistance as a secondary effect. (c) Through the fall in pressure (peripheral) there is a fall in the pressure of the of the heart and the co-ordination between the heart and the arterioles through the depressor nerve transfers the blood from the heart to the periphery with the net result that the peripheral pressure is raised through the dilator system.

According to this, there is a cycle of changes in the circulation; first factor in the cycle is the heart as an organ, second, vaso-motor nervous system; third, co-ordination of the other two factors in connection with inhibition represented by the pneumogastric and depressor nerves. The nervous control of this cycle represents a number of things: (a) What may be called arterial sway, that is, visceroperistalsis of the arteries; (b) The muscle coat in the arterial walls, innervated by the double set of fibers- the constrictor lessening, the dilator increasing the caliber of the walls.

Circulation, then, depends on: (a) The muscle action of the heart as an initial force. (b) On the distribution of the blood and a number of forces: (1) The nutrition of the heart- coronary system. (2) Oxygenation. That brings for the respiratory system and that explains their centers in the medulla. (3) Local control of distribution is registered by, and also completely controlled by, the vaso-motor system. The

importance of this last point is seen in two directions: (a) The real controlling factor is vaso-motion; (b) the vaso-motor system is both general and local:

1. General vaso-motor system is centralized in the medulla and is entirely tonic or constrictor. The increase or decrease in the waves of vibratile impulse passing out from this center determines the rise or fall in blood pressure in every part of the body. Note this point particularly. In dealing with vaso-motor system by treatment deal with it only when you want to get an effect on pressure (blood) and remember you must reach it in the medulla through the posterior branches of the first five cervical spinal nerves situated at the upper four cervical vertebrae. For example, give this treatment in case of engorged liver (stimulation.)

2. The local vaso-motor system is represented by subordinate centers at different segmental levels of the spinal cord. These centers in the spine are always subject to the control of the medulla centers. This means that in the vaso-motor system there are three great grades of neurons: (a) The cells of the medulla whose neurons pass out to and control (b) the cells of the spinal cord and brain found at different levels of the cord and brain from which neuraxons pass out through the spinal and cranial nerves to- (c) the cells of the sympathetic ganglia the neuraxons of which pass directly as gray sympathetic fibers to the muscles in the blood vessel walls, but operate only under the stimulus of (b).

In this way normally the cerebro-spinal, spinal and sympathetic systems are bound together and co-ordinated in functioning the vaso-motor forces. Under abnormal conditions when anything takes place that modifies the cerebro-spinal or spinal then the sympathetic ganglia cells can maintain the tone of the blood vessels; for example, if the medulla and spinal cells are cut off by obstruction the sympathetic ganglia can keep up the blood tone. That means that embryologically the true-vaso-motor function was originally in the sympathetic ganglia as a simple reflex and that is really the keynote of the entire work of Byron Robinson's Abdominal Brain.

In this local vaso-motor system: (a) the vaso-constrictor fibers are neuraxons from the medulla cells to the spinal cells; the neuraxons of these spinal cells passing out as white rami communicantes through the anterior roots of the spinal nerves (second dorsal to second lumbar, inclusive) into the sympathetic ganglia to be distributed as gray fibers beyond the ganglia; (b) vaso-dilator fibers pass out as neuraxons from the cerebro-spinal axis (the entire extent of it) through the cranial and spinal nerves, retaining their medullation as white fibers until their distribution in the blood vessel walls, hence the dilators do not terminate in sympathetic cells but pass from the anterior roots of the spinal nerves and cranial nerves out to their distribution.

The centers of vaso-dilation are found at the areas corresponding with the origin and exit of the nerves, that is, the nuclei of the cranial nerves and anterior horn cells in the spinal cord. The vaso-constrictor fibers, therefore, are the true sympathetic fibers that maintain the tone of the blood vessels and the uniformity of pressure and tension in the blood system. Viscerally they act independently like the inherent action of the heart, but they are under the regulative control of the spinal cord cells and the medulla cells in connection with sensory stimuli coming from the different parts of the body. This means that the medulla acts as a clearing house to receive stimuli from all over the body and this means that the influence of the vaso-constriction is both general and local; the vaso-dilator influence is purely local. The vaso-dilator fibers are all

cerebro-spinal, leaving the cerebrospinal axis along with the other nerves and retaining their modulation until they are distributed in the blood vessel walls. Vaso-constriction has a general or common center in the medulla; vaso-dilatation has no center, hence the vaso-motor mechanism when it has a constrictor and dilator sides may be said to consist entirely of vaso-constrictors because: (a) constriction alone is found both general and local; (b) it alone represents continual acting part of the vaso-motor mechanism. The head of the vaso-motor system, in its condition of maturity, is therefore the medulla and this acts in response to sensory stimuli from every part of the body. The local constrictor and dilator centers are simply subordinate centers or relay stations under this general vaso-motor center.

NOTE: The vaso-motor system is an inhibitor of the normal acceleration. Do not ever need to inhibit a nerve running centerward.

There are three centers of vaso-constriction: 1st, Medullary, 2nd, Spinal and 3rd, Sympathetic. This gives us a basis for the transfer of sensory impulses to the three centers and also a basis for the distribution through three grades of centers on the basis of cyclical action. The object of this probably is to co-ordinate the blood vessels in the deep and superficial parts of the body on the basis of tonicity. The sympathetic centers are the real vaso-motor centers. From these centers pass out: (a) the ten visceral gray fibers to be distributed in the blood vessel walls (peripheralward); (b) the gray rami communicantes, passing to the spinal nerves (centralward). These latter represent also: (1) minute fibers distributed to the skin (sensory) along with the posterior spinal fibers; (2) in the minute blood vessels in the superficial tissues along the spine.

This explains why the increase or decrease of sensory stimulation by manipulative treatment or otherwise to the superficial muscles and skin influences the vaso-motor centers both in the spinal and sympathetic ganglia with the result: (1) alteration of vaso-constrictor function to the visceral organs; (2) vice versa (and that is the effect of a relaxing or inhibitory treatment along the spinal muscles.

THE DEPRESSOR NERVE from the heart to the medulla represents another part of the sensory vaso-motor apparatus (inhibitory). The function of this part of the apparatus is: (a) to correlate with the entire body; (b) to co-ordinate the heart and the entire arteriole system.

Vaso-motion, therefore, depends on sensory stimulation: (a) Particularly from the heart; (b) From every part of the organism. In this latter case sensory communication takes place through the spinal centers and, if necessary, the medulla centers. In the former sensory communication takes place through the medulla centers. (Reflex (spinal) and automatic (medulla) action.)

This explains why the majority of diseases originate on the sensory side, the involvement of the vaso-motor apparatus being secondary. For example, in paralysis of vaso-constriction there is a stasis of blood in some local area resulting in: (a) congestion; (b) inflammation. Therefore, the best way to relieve all inflammatory conditions is from the sensory side of the nervous system involved so as to relieve vaso-motor paresis.

The vaso-motor nerves also represent: (a) The selective side of the nutritive processes; (b) the secretory processes. This means that the minute capillaries are dependent on vaso motion. For example, the vaso-constriction in the arterioles: (a) Increases capillary resistance; (b) lessens the blood pressure in the capillaries, and (c) Increases capil-



lary muscular tension. The diminution of vaso-constriction has the reverse effect.

If these results are found over an extensive area of the body the reaction always affects the heart. Hence, in typhoid fever, peritonitis, rheumatism, gout, etc. the heart is affected through the vaso-motor system and it is to be relieved through vaso-motor treatment. (Heart tonics, strychnine, nitroglycerine, etc. are not what are needed.) The theory to be carried into practice in this line of treatment is this, "to increase vaso-constrictor force is to increase resistance peripherally and vice versa." For example, to relieve the heart in a state of oppression, dilate the arterioles over the body, or in some large field of the body, for example, the mesenteric blood field. In applying this principle remember that the superficial and deep arterioles balance each other, hence, vaso-constriction of the superficial blood vessels tends to slow the heart because of the greater work demanded of the heart to overcome the resistance. Relieve this by dilating the visceral blood vessels. Another illustration of this is pneumonia, the heart is overworked from congestion of the lungs and whatever follows from this congestion, to relieve this get dilatation of the superficial tissues.

The vaso-motor center in the medulla is the regulator of vasomotion of the blood vessels in every part of the body subject to sensory stimulation. This is the reason for the medulla treatment in all diseases involving congestion or inflammation, the direct influence to the medulla by treatment compensating for sensory stimuli. This is also one reason for thorough air ventilation because the medulla needs a large supply of oxygen. The medull center influences the spinal centers, but these spinal centers are also subject to reflex stimulus from the segmental areas. This accounts for vaso-motor treatment being given principally to the skin, subcutaneous fascia, muscles, glands and viscera. (This applies principally to acute cases and is not of so much importance in chronic conditions.)

There are two pathways along which the vaso motor influences reach the blood vessels: (a) the spinal nerves; (b) the sympathetic fibers. An accessory pathway is (c) the dilator fibers, and it passes out from the spinal cord along with the posterior nerve roots. This means in treatment to reach: (a) and (c)- articulation of the spinal vertebrae with soft tissue treatment in the same area. To reach (b)- Articulation of the head of the rib, particularly upward, because sympathetic fibers lie towards the <sup>end of the</sup> upper head of the rib.

Irritation of the dilator fibers (c), or the complete inhibition of the constrictor fibers (a) and (b), result in dilatation of the arterioles, that is, an active hyperaemia, for example, muscular, osseous, etc. lesions, either primary or secondary, irritation of the mucous membrane of the alimentary field. The vaso-dilator nerves accompanying the sensory nerves to their distribution to the muscles, mucous membranes, cells and glands, for example, in the dilation of the stomach for the digestion of food, if this dilatation becomes excessive so that there is hyperaemia of the stomach, we find along with it sensory irritation of the skin, muscles and mucous membrane in the stomach area of the spine, that is, hyperaemia and hyperaesthesia, or, as we speak of it osteopathically, tenderness at the fourth, fifth and sixth dorsal. To relieve this give treatment:

To reach (a), (b) and (c), beginning with the treatment of (a) and (c) and then (b). The vaso-motors playing against each other in constriction and dilatation represent: (a) The motor fibers to preserve the tonic state of the blood vessels and the tissues; (b) the sensory fib-

ers to keep up the persistent rhythmic relaxation of the tonic state of the blood vessels and tissues, that is, these two nerves each are complementary and in the treatment of muscular conditions, rigidity, or over-relaxation treat (a), (b) and (c) as above.

Another point of great importance is that the deep and superficial circulations are complementary to one another, the vaso-constriction of the superficial is counterbalanced by vaso-dilatation of the deep, and vice versa. (Never forget this in treating acute diseases.)

The osteopathic treatment of the vaso-motor system may be divided into two parts: 1st: Steady pressure to cut off the sensory impulses that are passing to the vaso-motor centers from the cutaneous and other sensory fields. According to Head's law this means that we are dealing with deep static conditions. (This is the theory in appendicitis, that is, strong inhibitory treatment in the lower dorsal region.) Sensory nerve supply to the appendix comes in at the two last dorsal nerves. 2nd: Rhythmic treatment for the muscles in the area of irritation to remove muscle contraction, irritation, etc., so as to prevent blood from being obstructed as it advances toward the superficial blood vessels. This rhythmic treatment consists of alternate inhibition and stimulation in the area involved.

For vaso-motor treatment the spine is divided into regions:

(3) Strong inhibition in the subocciput, extending as far down as the fourth cervical, relieves congestion of the head and from the medulla centers co-ordinates the calibre of the blood vessels all over the body, tending to distribute vaso-motorly the excess of blood retained for the time being in the cranium in the state of congestion. This suboccipital and upper cervical pressure also diminishes blood pressure through the entire blood system. There are three results from this inhibition: (a) It checks the sensory stimuli passing medullaward by inhibition over the minute fibers going to the medulla; (b) It controls and co-ordinates local capillary circulation, both from the blood and nerve sides, indirectly affecting the entire vaso-motor system. The theory of this is that to diminish the number of stimuli and to relax the capillaries so as to retain a larger volume of blood is to relieve the medulla irritation and also all of the nerve supply to the rest of the body (vaso-motor);

(3) It produces a counteraction to the superficial body constriction with a reaction, namely, dilatation of the superficial blood vessels preventing an excess of blood from remaining in the cutaneous capillaries and arteries. The above is the first great area, and is the most important in vaso-motor treatment.

(4) The next area which has a great effect on the vaso-motor system is the great splanchnic area—fifth to tenth dorsal. This area controls local vaso-motion to the entire abdominal mesenteric circulation. This area can receive all the blood of the body and take care of it without detriment to the system. Hence, in congestive headache, inhibition in this area tends to palliate the condition, because through the cutaneous and subcutaneous reflexes a superficial cutaneous and subcutaneous constriction is produced reacting by opening up through dilatation the deep mesenteric arteries and also dilating the arteries in the dorsal region of the spinal cord (deep circulation of the spinal cord.) In this way vaso-motor (constrictor) control to the arteries is suspended temporarily and the blood gravitates into a field that can be freely controlled by inhibition (continues from time to time to treat by inhibition,) from the fifth to the tenth dorsal. The final result differs from the temporary result, the object of this treatment being to palliate an aggravated dis-

turbance so as to keep the patient free from irritation until the exciting cause or the real disturbing condition is removed. For example, congestive headaches in any of the acute diseases can be relieved in this way so as to keep the patient soothed until the real condition represented by the acute disease is relieved. The results operate as follows: (a) Temporary result is to increase the blood locally, to keep it circulating in a local field practically isolated from general vaso-motor control so as to relieve the aggravated disturbance of congestion elsewhere by producing, or temporarily establishing a counter congestion; (b) The reaction results, if it is kept up for a sufficient time, in the normal distribution of the blood and the vaso-motor control of this distribution as soon as: 1. The sensory stimuli of the center irritated are diminished; (2) the tissues are completely relaxed; (3) the center and the field of previous congestion become accommodated to the free co-ordination of the blood circulation.

#### THE LOCAL AREAS OF VASO-MOTION.

1, HEAD: (a) the lower head in general.- The superior cervical ganglion (the true constrictor tonic function.) (b) the brain, the superior cervical ganglion through the sympathetic nerves of the anterior and middle fossae via the Carotid Plexus. The inferior cervical ganglion through the sympathetic nerves to the posterior fossa via the Vertebral Plexus. General Cerebral circulation.- in the splanchnic area, because of the effect produced upon general blood pressure via reaction on the Carotid and Vertebral circulation (blood pressure). This is a physical-physiological reaction from the force of the blood stream. (c) Eyes.- Superior cervical ganglion through the fifth cranial nerve via its sympathetic branches.

2, NOSE, THROAT AND APPENDAGES: (a) Tongue.- dilator nerves for the tongue and mucous membrane via the lingual branches of the fifth cranial nerve and via the ninth cranial nerve; (b) Nose, tonsils, throat, superior cervical ganglion via the ninth cranial nerve, first cranial nerve and the tenth cranial nerve; (c) Muscles of the Neck,- Superior, middle and inferior cervical ganglia, via the anterior and posterior primary divisions of the spinal nerves. (d) Thyroid Gland,- Middle and inferior cervical ganglia; also vaso-constriction in connection with the head, face, eyes, tonsils, neck and pineal gland- the spinal cord, second to fifth dorsal, via the three cervical ganglia of the sympathetics.

3, THORAX AND ITS APPENDAGES: (a) Heart.- (1) the tenth cranial nerve especially on the left side particularly in connection with its established sympathetic connection at the third, fourth and fifth dorsal. (2) Vaso-motors to coronary arteries reached in connection with the corresponding ribs and interspaces that lie in the heart field (second to sixth ribs). (3) Accelerators, first, second and third dorsal nerves; (4) Cardiac nutrition,- Middle and inferior cervical ganglia of the sympathetics. (b) Lungs, second to ninth dorsal via corresponding spinal nerves and sympathetic ganglia.

4, ABDOMINAL FIELD AND APPENDAGES. (a) Liver, sixth to tenth dorsal on the right side, via corresponding spinal nerves and sympathetic ganglia; (b) Spleen, eighth, ninth, tenth and eleventh dorsal on left side via corresponding spinal nerves and sympathetic ganglia. (2) tenth cranial nerve, motor and vaso motor constricting the muscle fibers of the splenic trabeculae; (c) Portal System- fifth to ninth dorsal through spinal nerves and sympathetic ganglia. (d) Intestines, fifth dorsal to second lumbar via segmental areas in connection with the spinal nerves and sympathetic ganglia: (1) vaso-constrictors to the mesenteric

blood-vessels, splanchnic area fifth to tenth dorsal through corresponding spinal areas, spinal nerves and sympathetic ganglia; (2) Vaso-dilators, also in splanchnic area through spinal nerves (not the ganglia.) (3) Kidneys- tenth to twelfth dorsal through spinal nerves and sympathetic ganglia.

5, PELVIC FIELD AND APPENDAGES: (a) Internal generative organs, vaso-constrictors- first and second lumbar through spinal nerves and sympathetic ganglia; vaso-dilators first to third sacral nerves via pelvic plexus not through the sympathetic ganglia; (b) External generative organs- (1) Vaso-constrictors, first and second lumbar via spinal nerves and lumbar sympathetic ganglia; (2) second to fifth lumbar via spinal nerves and thro' the hypogastric and pelvic plexuses and thence through the pudic nerves to the genital organs; (3) vaso-dilators- first to third sacral nerves nervi erigentes via the pelvic plexus through the spinal nerves without passing through the sympathetic ganglia. (c) Genito-urinary system, for ELIMINATION: (1) Vaso-constriction- first and second lumbar via the spinal nerves through the lumbar sympathetic ganglia; (2) second, third and fourth lumbar via the hypogastric and pelvic plexuses through the spinal nerves to the bladder and urethra; (3) Vaso-dilators, first to fourth sacral nerves via the pelvic plexus without passing through the sympathetic ganglia.

6, THE EXTREMITIES: (a) The Upper Extremities, (1) Vaso-constriction of the cutaneous and subcutaneous tissues second to seventh dorsal via the spinal nerves and sympathetic ganglia; (2) Vaso-dilators- via motor nerves to the muscles. (b) The Lower Extremities, (1) Vaso-constrictors sixth dorsal to second lumbar via spinal nerves and sympathetic ganglia; (2) Vaso-dilator fibers via the motor nerves to the muscles.

7, BODY TRUNK: (a) Vaso-constrictors at the segments corresponding with the different regions of the body from the second dorsal to the second lumbar via spinal nerves and sympathetic ganglia; (b) Cutaneous vaso-constrictors directly from the sympathetic ganglia in the spinal area corresponding with the regions of the body along the entire length of the spine; (c) Vaso-dilators via the motor nerves to the muscles of the different parts of the body.

The vaso-motor system represents a cycle of activity: (a) From the constrictor side- the continuous diminution of the calibre of the blood vessels in connection with vaso-tonicity and subordinate to this vaso-tonicity of the tissues supplied; (b) From the vaso-dilator side- the continuous increase of the calibre of the arterioles and consequently variations in the tonicity of the blood vessel system and the tissues supplied. This means that dilatation is the KEY to the mechanical influence of the circulation. Primarily it is a function of the cerebro-spinal system, especially the tenth cranial and the depressor nerve, with the great center in the medulla which is positively, when functioning, normally a constrictor center, but when functioning abnormally, negatively by inhibition it is a dilator center via the general dilator system. This center lies on both sides of the median line and is closely associated with the antero-lateral nuclei of Clark. This primary center is constantly active: (a) in submitting tonic impulses; (b) in directing and regulating the local centers in particular areas of the spine.

The dilator function has no central center positively but acts as an emergency apparatus to modify tonic or hypertonic constrictor action under local stimulation (may be either sensory from some area or from mechanical treatment.) The dilator centers therefore are local and are found at all the levels of the cerebro-spinal axis. Their chief function is to inhibit the constrictor function and as that passes out from local

points to the cerebro-spinal axis their action is always local.

The vaso-constrictor center in the medulla always acts through the subordinate centers located in the spine. The spinal centers act through the visceral reflexes in the lower sympathetic centers. These centers represent the rhythmic regulation of the tonic state of the blood vessel walls.

The constrictor fibers originate from the 2nd dorsal to the 2nd lumbar, inclusive, and represent symmetrical and differentiated nerve fibers originating from the corresponding centers; these constrictor fibers are connected either directly or indirectly with the medulla center and pass out through the column in the spinal nerves as white rami communicantes; they pass up or down in the spinal ganglionic chain and lose their medullation before leaving the ganglionic chain, passing out as true sympathetic fibers along the pathway of distribution of the gray rami; or (2) directly to the viscera; or (3) indirectly to the viscera via the prevertebral plexuses.

The dilator fibers are regular modulated spinal nerves until their final terminal distribution passing out from the spine: (1) through the sympathetic ganglia (without terminating) as white efferent fibers (2) or passing out along the motor nerve roots; or (3) along the cranial nerves in either case distributed along with the motor and trophic nerves in the muscles of the blood vessel walls.

When the constrictors are active there is an increased peripheral resistance to the passage of the blood from arterioles to capillaries and thence to veins. The result of this by reaction is to increase the activity of the heart, this change in heart action depending on: 1st, the amount of constriction; 2nd, the extent of the area involved in constriction. To counteract this reaction effect the Depressor nerve acts as an emergency nerve, carrying sensory stimuli of hyperreaction representing: (a) overwork of the heart, (b) overconstriction of the arterioles to the vasomotor center in the medulla with a complex reflex result, namely, to lessen the hypertensive condition of vasomotion by diminishing hypertensive arteriole tone via the inhibition of the constrictor function of the abdominal splanchnics.

When the vaso-dilators are active the blood pressure is diminished, the fall in pressure depending: (a) on the extent of the area dilated; (b) on the degree of dilatation. The principal effect of a local dilatation is to cause a flushing of the capillaries and suddenly throwing a large volume of blood into them. Capillary change is very different from arteriole change; in the capillary walls there is no muscle (independent tissue) and therefore no vaso-motor fibers. Hence, the dilator and elastic recoil of the capillaries depends entirely on the extensibility and elasticity of the connective tissue plates in the capillaries under the influence of blood pressure. The change in the capillary fibre calibre, therefore, is purely physical and passive. This means that in bronchitis, pneumonia, etc. the only way to relieve the capillary congestion is by some physical means, or by some physiological means which will indirectly influence the capillaries.

In the arterioles we find the muscular fibers supplied by the vaso-motor nerves; when vaso-constriction predominates the arterioles: (1) check the forward movement of the blood; (2) modify the pressure of the blood. This means that the function of the arterioles is PHYSIOLOGICALLY to lessen and regulate the amount of blood passing to and through the capillaries. To dilate the arterioles therefore (by vaso-motor system) means: (1) Full and uncontrolled movement of the blood forward, (2) and the full extent of the blood pressure transmitted from arterioles to capillaries with the net result—dilatation of the capillaries. Therefore, constriction of the arterioles diminishes and dilatation of the arterioles increases capillary pressure.

This is the reason why pneumonia or broncho-pneumonia-ocgestica, unless relieved, is bound to result fatally, because when the capillaries are filled up with blood the blood is locked in in such a way that it cannot escape. The only effective treatment to relieve this is a treatment that will change the capillary pressure and the most effective means of accomplishing this is: (a) physically because the capillaries and their pressure condition represents a physical condition, or (b) indirectly by vaso-motor treatment of the arterioles to unlock the condition of restricted blood circulation so as to force the blood out of the capillary system.

In all vaso-motor treatments begin with: the great vaso-motor center in the medulla. This center is continually in action producing arterial tone. This arterial tone depends on: (a) the condition of the blood that acts on the center; (b) the state of the temperature apparatus; (c) the series of stimuli reaching the center from the periphery. Hence, the medulla center action is best effected: (a) through the blood in connection with the vertebral circulation. This is best treated by inhibition or stimulation: (1) in the region of the atlas, particularly occipito-atlantal articulation; (2) at the seventh cervical in connection with the tips of the articular processes. (c) Through the upper end of the superior cervical ganglia; the fibers from the upper cervical ganglia and the upper spinal nerves passing up to the medulla just above the superior cervical ganglia.

The condition of the action of the heart is reported to the medulla: (1) through the sensory nerves that pass up via the superior cervical ganglia; (2) through the Depressor nerve. Therefore, to stimulate the sensory nerves above the superior cervical ganglion, below the occiput and in the supraclavicular fossa also, the depressor nerve will increase the action of the vaso-motors. The sympathetics in the cervical region contain or transmit the afferent fibers so that when these sympathetics are stimulated they in turn stimulate the vaso-motor center in the medulla. The correction of lesions in this area will liberate and normalize the chain of vaso-motion;

(c) The subordinate vaso-motor centers in the spinal dorso-lumbar region may best be affected by the articulation of the spinal vertebrae. This will tend to correct microscopic lesions, minute inequalities in the tissues and will give a direct effect to the constrictor reflex centers; (d) remember that vaso-motor action represents a cycle in which to have: (1) Vaso-constriction with its apparatus of centers and fibers; (2) Vaso-dilation with its apparatus of centers and fibers; (3) the cardiac cycle, consisting chiefly of the cardio-inhibitory center in the medulla, of the pneumogastric and depressor nerves and their sympathetic connections along with the cardiac and pulmonary plexuses.

Constriction may be affected through dilatation or through the heart. Dilator action and effect are primarily local and these may be modified by light treatment because dilatation being the emergency function the dilator system is the open pathway. Hence, in treating along the spine this is the rule that is to be followed from the vaso-motor side "A LIGHT TREATMENT WILL EFFECT THE DILATORS, STRONGER TREATMENT WILL AFFECT THE CON-STRICTORS." and the latter will always produce an effect that will remain for a long time.

IX. In stimulating the vaso-motors remember that there is always an inverse relation between the cutaneous and the deep visceral blood circulations. As the vaso-constrictors are distributed to the cutaneous and deep visceral circulations these will act in inverse order in relation to each other.

The dilators are distributed chiefly to the skeletal muscles and the glands, being largely, if not altogether inhibitory, sensory nerves of the same order as the cardio depressor nerve. This means that the dilators and constrictors represent the two sides of a reflex apparatus; the dilator (sensory) furnishing stimuli from the muscular and glandular systems which act through the local centers in the spine or brain (cranial nerve nuclei) acting on the motor side upon the cutaneous and deep blood vessel walls through the vaso-constrictors. Therefore, vaso-motor (tonic constriction) action of the medulla and the spinal centers may be inhibited:

- a. Normally, by the dilator apparatus which represents stimuli of inhibition from the active muscular and glandular systems;
- b. Abnormally, by mechanical inhibition (pressure) designed to cut off the impulses which stimulate the centers to function efferently;
- (c) Correction of lesions will remove irritation and enable the vaso-motor apparatus to function normally in the complete vaso-motor chain.

III. As the rate of heart action and pressure in the arterial system vary inversely-- when the pulse is rapid peripheral resistance is low and vice versa-- unless there is something locally abnormal. Hence, the chief treatments to effect vaso-motion are:

- a. The correction of lesions (osseous, muscular, ligamentous, etc.) that tend to interfere with, irritate or obstruct some part of the vaso-motor chain. This always tends to normalize: (1) The blood circulation; (2) glandular action; (3) Heart action.

- b. Inhibitor pressure in the sub-occipital area and at the seventh cervical. This mechanically checks blood flow from the brain, arousing into action the vaso-motor system in general all over the body, tending: 1. To equalize vaso-motor action in general; 2. The pressure inhibits the agitated nerve supply to the meninges and this tends to check the increased blood pressure in the minute arterioles that supply the blood to the medulla.

The net result of this is to equalize the blood supply to the medulla, to normalize vaso-motor action, to equilibrate the arterial tone, and by the action, to lessen the over-active part by checking the sensory stimuli from the heart to the brain and medulla, and also from the accelerator center in them to the heart;

- c. Treatment directed to the temperature apparatus always reacts on the vaso-motor system. This treatment is best given aside from the correction of lesions:

1. By inhibition over (a) the vertebral arteries; (b) steady pressure downward along the carotid sheath, the result of which is to check the blood supply to the thermogenic center, lessening its activity and determining the blood away from the brain centers, that is, removing the irritation of congestion.

2. By stimulation of the splanchnic area, causing the splanchnics to constrict the mesenteric blood vessels and producing dilation of the cutaneous capillaries.

The result of this is to increase peripheral capillary circulation, thus aiding the thermolytic action: 1. In stimulating the activity of the perspiratory glandular system; 2. In preparing for the physical processes of conduction, radiation and evaporation of heat. The net result of this treatment is to normalize the vaso-motor system.

- d. Inhibitory pressure in the inferior cervical ganglion region (seventh cervical, first dorsal) tends to check the action of the heart by stimulating the rhythmic action of the inhibitory fibers of the heart

and also stimulating the depressor nerve action.

The net result of this is by reaction to increase vaso-constriction in the arterioles, producing a general tonic vaso-motor effect throughout the entire body.

e. One of the most important factors in osteopathic vaso-motor treatment is the stimulation of the vaso-motors. The muscles along the spine, when contracted, irritate the vaso-motors producing constriction of the peripheral blood vessels. The result of this muscular lesion is increase of blood pressure in the collateral circulation, that is, in the arterial blood vessels of the spinal cord, viz, congestion. Hence, if we treat the blood supply to the spinal cord we treat it through the blood supply of the muscles along the spine.

The principle of this treatment is the inverse relation of hyperaemia in the muscles along the spine and anemia of the spinal cord blood supply and vice versa. Both of these conditions affect the spinal cord centers:

1. Hyperaemia produces congestion, stagnation of blood and inhibition of the center action; 2. Anemia acts as an irritant to the spinal center cord centers.

In correcting the correlation of the blood supply in the muscles along the spine and in the spinal cord we restore the normal function of the nerve centers and thus normalize the nerves to the organs that are affected. The stimulation of these spinal centers depends on the aeration or non-aeration of the blood of the spinal cord, in the one case producing inhibition and in the other stimulation to that particular region of the spinal cord that is affected.

Osteopathic treatment through the vaso-motor system aims primarily to change the condition of the blood and thus to give physiological stimulus to the nerve center action.

f. The ultimate osteopathic treatment is to produce co-operation in the activities of the spinal cord and the sympathetic system. This is done by constitutional spinal treatment which consists of:

1. The relaxation of the muscles, if they are contracted; the tonic contraction of the muscles, if they are relaxed; the trophic up-building of muscles if they are in an atrophic, badly nourished or debilitated condition.

2. The correction of any muscular, osseous or articular lesions found along the spine.

3. Stimulative articulation from the suboccipital region to the coccyx on both sides.

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## MECHANICAL MOVEMENTS USED IN OSTEOPATHIC WORK.

Here we have to specify and explain the various mechanical movements, used as means or agents in mechanical therapeutics. This implies that manipulation of some type or kind is used as the mechanical means. The manipulation is designed to promote adjustment by the correction of structural lesions, or by the use of manipulative means to produce, stimulate or inhibit movement or mobility to reach the activities. This is especially so in the case of acute conditions where palliative, as well as corrective measures must be adopted to secure therapeutic effects.

Here it must be noted that no close distinction can be drawn between Osteopathy on the one hand and physical exercise and massage on the other, because many of the exercises and movements used in these fields may be, and often are, used with therapeutic design in the osteopathic field. It is to be noted here that the differentiation between osteopathy and any other mechanical system does not rest upon the type of movement but upon the principle or object with which the movement is associated. If the therapeutic purpose is that of adjustment, then any movement may be osteopathic. Otherwise no type of movement would be osteopathic. This emphasizes once more the principle in the philosophy of Osteopathy, that means represent the method, whereas the foundation principle represents the true philosophy—the principle of adjustment.

This explains a point sometimes raised, can the average M. D., untrained in Osteopathy ~~xxxxxxxx~~ give an osteopathic treatment? Would the treatment of the average masseur unacquainted with Osteopathy be osteopathic? Our answer to both of these questions is, No, because it is not a question of giving a certain movement, or series of movements. The question is, do these movements tend to promote the adjustment called for by the osteopathic principle.

This idea must be kept in mind through this lecture, because these movements are enumerated simply as means which, when effectively used in the execution of the osteopathic principle, have a therapeutic value. The movements have no intrinsic or per se value in themselves and apart from the principle applied, and the object aimed, have no relation to Osteopathy whatever. This determines which movements may and may not be included in the category of mechanical movements to be used in the osteopathic field. The manipulative side of osteopathic therapeutics may be divided into two departments, namely, active and passive movements:

(1) ACTIVE MOVEMENTS. These are movements applied to or by the body in which the patient is active, that is, the patient gives or takes the movement or makes the movement for himself, for example, the different forms of exercise. There are some people who say that active exercise is not osteopathic. Osteopathy, however, has never been limited and so far has never been defined, so no one is in a position to say dogmatically what is Osteopathy or define its limitations. Experience has taught us that a great deal can be done actively that cannot be passively.

Active physical exercise has a physiological value along the lines of adjustment: (a) because it brings into play within the body the voluntary elements of the nervous and muscular systems, that is, motion is brought about or regulated by the will of the patient. Sensation is affected also through the will of the patient; (b) voluntary co-ordination is brought into play. In the purely passive movements the results of treatment are purely reflex. Co-ordination, when it is influenced by the passive movement being influenced through the reflex center. We can apply that

principle to a child in walking, for example a child is not able to walk: lay the child on its back, put it through the kind of movements that it would go through in locomotion, then put it on its feet. If the latter were not added to the former the child would never walk, that is, we would get the reflex response, but not the voluntary response. To become active it must become voluntary.

The same principle applies where there is any kind of disease. The best illustration of this is found in locomotor ataxia. This requires not only to be treated passively to correct disturbed conditions and lesions, and remove interference with nerve force and blood supply, but also actively. In locomotor ataxia we must begin the education of the voluntary muscles, teaching the patient to use these muscles just as in the case of a child. It is more difficult in locomotor ataxia than it is in the child, because on the mental side the patient looks for different outlets for energy, while in the child function follows after function is a gradual process of unfolding or evolution. There are many cases of locomotor ataxia that are not cured osteopathically because the active side is overlooked. We must remember that the education of muscles is a voluntary education that can take place only by the patient himself, or under his supervision. The education of the nervous system in its use of and control over the muscular system is an important therapeutic principle of adjustment.

(c) Active exercise calls into play muscles and muscle activities which passive exercise cannot reach. This question of active exercise is one of the unexplored fields of Osteopathy. The effects that may be produced by the active exercise are shown in other fields. The difficulty with most active exercises is that they are developed by those who have no knowledge of physiology. Physical culturists teach systems which are anti-physiological. Physiology, for example, teaches us that physical exercises that are necessary in breathing are to be distributed in certain proportions between the upper and lower parts of the chest. The same thing applies to all the active exercises that can be prescribed. It is not physical exercise we need, but physiological exercise.

Dr. Kellogg has developed a system of active exercises in connection with the dynamometer. Primarily this is an instrument for measuring the strength of the muscles. It is constructed in such a way that it can test every muscle in the body as well as the nerves and nerve centers. Hence it can be used to test the entire motor apparatus of the individual. In case of paralysis he tests every voluntary muscle in the body to find out what muscles are tending toward paresis and prescribes to the patient exercises for those weak muscles to build them up into co-ordination with the other muscles. Such a plan as this can be used to establish co-ordinations and build up weak muscles to the strength of the strong ones. (The Value of Strength Tests, J. H. Kellogg.)

(d) Exercise should be prescribed for each particular case to suit the muscular and nervous conditions. This is a point that requires to be attended to, particularly to build up the muscular system. In determining what physical exercise is required:

(1) The main point to keep in mind is to strengthen the weak muscles so as to co-ordinate with the stronger muscles. This can be determined only by finding out what are the weak muscles.

(2) Active physiological exercise should be taken in the morning, if it is possible for the patient, before anything is taken in the form of food. (a) One reason for this is that the relaxation in the morning is more complete than at any other time during the day. (b) Another reason is

that the muscular system is as free from voluntary control, that is, as nearly automatic as it can be. This is a very important point because the mind always tends towards the weakest part of the muscular system; hence if a patient is busy with some occupation or thinking of himself without being busy the mind becomes more concentrated as the day goes on on the weaker part of the muscular system.

(e) One of the strongest points in active exercise is mental control, sometimes called the power of concentration, with the capacity of throwing the will into the muscular system to produce what we may call, for lack of a better term, a voluntary reflex. This voluntary reflex gives us control of the entire co-ordinating system.

(3) In prescribing physical exercise make the patient limit the exercise by the point of exhaustion, for example, in taking deep breathing exercise, don't take it as physical culture says, ten times, but take it until the point of exhaustion. In moving the arms, take the movements up to the same point, because when muscle reaches its most receptive mood, which is the point of exhaustion, it is ready for nutrition, and that is what we want to promote. What do we mean by the point of exhaustion? The point at which the muscle does not want to do any more work, and needs stimulating to make it do more work.

(4) In prescribing physical exercise remember that all active movements should be given with periodicity, that is, if you prescribe it in the morning, make the patient take it every morning at the same time. The reason for this is, that the muscle gets to the point where it makes an effort to keep up its strength to the time for treatment. Periodicity tends to develop the sustaining capacity of the muscles and nerve systems.

(5) In determining what active exercise to prescribe, take account chiefly of the antagonistic action of the muscles, for example, in cases you can reach the muscle by exercising the antagonistic muscle, for example, in the limbs, if the flexors are weak, you will get the best results by dealing with the extensors.

(6) In prescribing physical exercise always prescribe some general exercise, because while you build up the weak muscles by some special exercise you must make the weak muscles feel that they have to act along with the strong muscles. This is well illustrated in a case of paralysis, for example, if you are treating a paralyzed arm, either partially or completely paralyzed, make the patient move the paralyzed arm, if necessary with help, so as to get the exercise of the paralyzed muscles and then make the patient move both arms in sympathy with one another.

This treatment is also applied in passive treatment, for example, we can often get the best results in the case of a paralyzed arm or leg by treating the other arm or leg, because it stimulates the blood supply and the same thing applies to active treatments, in all cases of paralysis. Make the patient move the paralyzed limb, and if the patient does not feel inclined to do this, make it a matter of compulsion.

Any system of therapeutics must have the active co-operation of the patient. In this we must pay close attention to the habits of our patients. Sometimes habits are cultivated that are detrimental to and destruction of health. Such habits must be controlled from the active side of self control. Muscular contraction is one of the chief factors in leading up to the osseo-ligamentous lesions along the spine. These contractures are dependent very largely on muscle habits cultivated by patients and the exercise, non-exercise or over-exercise of the muscle sense. In many cases the relief of the muscle contraction upon the operating table

does not persist after leaving the operating table because of a perverted muscle sense and muscle habits. These muscle habits begin by automatism, are involuntary and hence cannot be overcome without close attention. The best prescription for such a case is the active exercise of the will in connection with some form of simple exercises to be done exclusively by the patient. One thing that every patient, in fact every one, ought to do is to relax completely the entire muscular system. In nervous cases particularly the tension of the muscles is a habit and as such a common hindrance to recovery. Some patients claim they cannot relax. Most, if not all, patients, however, can do so. If a patient cannot sleep, make him go out and walk five or ten blocks.

When conditions are corrected it is the duty of the patient to aid in the treatment by keeping the correction normal. This is done by the attempt on the part of the patient to let go the contracting grip kept up in the field of correction. Simple exercises should be prescribed in all cases with a view to the employment of the voluntary capacity of the individual in the effort to restore to normal and preserve the muscle balance normally. The kind of exercise will depend upon the field to be covered. In my experience the best method is to teach

(1) the patient to relax perfectly; (2) make the patient realize that his skeletal muscle system is voluntary and that he can get control of the entire motor apparatus, or that all the body movements can be controlled. If the muscles in any particular part of the body are to be developed teach the patient how to use these muscles so as to secure their development. (3) Give the patient something real to do in the form of exercise. The basis of this something is the exercise of the muscular system: (a) in connection with the principle of antagonism, (b) following the development of antagonism by the use of the principle of muscle rigidity. Each patient must be a law to himself, because no set of exercises can apply to two people at the same time. The intelligent use of such exercise will control the blood supply.

In a case of typhoid fever treated recently the patient complained of a burning sensation at the occipital portion of the head. Treatment to stretch and articulate the neck always relieved; but the patient was four or five miles away and I could not be present all the time. I taught the patient while lying on the back to elevate the head and lock at the feet, crossing the arms over the lower half of the chest and applying pressure over the chest to prevent the rigidity of the abdominal muscles. In addition I recommended the use of one hand to lift up the head and pull it forward. These movements executed gently by the patient tended to stretch the ligaments of the neck and the long muscles of the neck and spine, with the result that congestion of the head was kept under control.

In the same case, during the convalescent stage a semiparalysis of the feet developed. I taught the patient to place one hand under the posterior innominate and support that side of the pelvis while he elevated the limb on the other side, rotated it at the hip, flexed at the knee and extended in rigidity of the muscles of the calf of the leg with the toes curled. The first time he did that he said he felt a glow of warmth pass down the limb to the toes. The same technique was applied to the other limb. During the time this was being done, the free hand was placed right over the center of the abdomen with light pressure, to prevent abdominal tensing.

This is given as an illustration. We must find out the exact physical condition of the patient, and prescribe certain things that can be

done that will be helpful in the particular case, making the patient depend on himself in cases of emergency. It helped the patient and saves the doctor. Not long ago I had a patient who claimed he felt fainting spells come on very frequently. The patient was so placed in the alcove of a room that his head was towards the main part of the room. His nurse sat in the room. I took a piece of card-board and wrote on it in large letters with a blue pencil the words "fainting- help me". It always lay alongside of him in close proximity to his left arm. I instructed him every time he felt the spell coming on to raise the card-board sign in his left hand above his head so that the nurse could see it. It acted like a charm. I did not tell him nurse what I wanted until after he was well. She was instructed to take a glass of water and give him a few teaspoonfuls. What was accomplished? The exertion of lifting up the left arm pulled up the whole left side, liberated the heart and cured the fainting.

(3) PASSIVE MOVEMENTS These may best be subdivided into two types (a) the absolutely passive movements in which the patient is thoroughly relaxed and the will of the patient is separated as much as possible from the movement and the field of movement; (b) the passive reflex movement. In this case the movement takes place in a reflex way.

(b) The Passive Reflex Movements. The reason for taking them in this order is, that these passive reflex movements lie midway between the active movements and the absolutely passive movements. In the passive reflex movements the movements are all applied superficially, for example, treatment is applied to the skin for the purpose of reaching the deeper structures, such as the muscles, ligaments, etc., in a reflex way. All the soft tissues are attached to the bones and this union of soft and hard tissues finds its keyboard of expression reflexly on the surface of the body. This means that it is not the soft tissue or the hard tissue, but the union of the two that gives us the reflex movement.

The blood and nervous systems can be reached through the skin and by these passive reflex movements. In producing these results the passive reflex stimulation may be applied externally or internally, for example, by Pressure or movement of the fingers or hands on the surface of the body, or by the application of heat, cold, light (in certain cases). These are used as means of causing a passive reflex movement just the same as we would by the fingers, the same results being gained in both cases. Internally, the stimulation may be produced by the food, anything that falls under the head of proximate principles. This includes some things that are used at the present time as medicines, which really, however, are foods. When fainting give the patient a cracker, or a glass of water or a swallow of air. The effect of the use of these is to alter the blood, either in its ratio or flow, in its pressure, or in its volume; by change of organs, either in their position, or in their rhythmic action, or by change in the size of the organ. The change in the size of the organ is frequently an important point in the treatment of a case, for example, we can change the size of an organ by increasing or decreasing its blood supply. This applies principally to such organs as the liver and spleen.

In the passive reflex movements the media, therefore, are:

(1) Muscle tissue, acting as a medium between osseous and ligamentous tissues. In this case the muscle tissue responds to direct manipulation applied locally to the tissue in the form of some type of stimulation or inhibition, or articulation.

(2) The muscle tissue will also respond to individual manipulation. In this case it is the musculo-osseous structures that become the media of the manipulative work. Here the main type of treatment is articu-

lation. Articulation is used here in the wide sense of the term, bone articulating with muscle as well as with bone and ligament.

This represents the largest field of passive reflex Osteopathic treatment, for example, it includes the correction of lesions. This applies to the movement of bone, this movement in turn causing the muscles to change their relations, the result of this change being to make the articulation of one bone with another bone or with a soft tissue, an indirect method of the stimulation of the muscles. Here the lesion is of importance because it represents lack of adjustment and this interference with the tissues causes malposition of tissues and interference with function and with nutrition indirectly. It may also interfere with the functioning of organs. Any type of displacement interferes directly or indirectly with the functional activities of the soft tissues. In this case the passive reflex is secured: (a) By correction of the misplacement. (b) By articulation of the misplaced structures or the contiguous structures.

These two points are important in the field of practice in differentiating lesions into primary, secondary and tertiary. For example, take the last lesion to exist, we work in a general way by articulation and this often gives the better results than an attempt at direct correction, because articulation with structures gives a reflex to the structure that is affected,

Most of the passive reflexes are located in connection with the great centers along the spine. These can be reached by articulating the spinal vertebrae; hence every treatment that consists of articulation of the spine stirs up the passive reflexes in the spinal cord. Some writers explain that it is possible to articulate the spinal vertebrae. The possibility of articulating the spinal vertebrae depends on the following facts:

1. We find normally in the spine a slight movement of each vertebra in relation to its neighbor vertebra. The movement is possible because the capsular ligaments are loose and under stimulation are capable of contraction.

2. Each individual vertebra is capable of a slight rotatory movement. In this case it is the muscles that make the movement possible. When the spine becomes rigid the rigidity is produced chiefly by the contraction of the spinous muscles; in some cases by traumatism or injury. When these muscles are contracted normally by cold, by toxic substances in the circulation, or as a result of lack of nutrition, the muscles suffer first and then the ligaments later. When these soft tissues are primarily contracted we have secondarily what is called sub-luxation of the spinal vertebrae. A sub-luxation of the spine, therefore, is a manifestation of inequality in the activity of opposing muscles, or groups of muscles, and this may be produced by lack of circulation, lack of nutrition, effects of colds, etc. We find this illustrated, for example, in stiff neck, the result of sitting in a draft, or from some traumatic cause, such as a fall, sprain, strain or twist. Read the work on "Sprains" by Moullin, particularly the chapter on "spinal sprains".

Curvature of the spine, sometimes representing tubercular conditions, is often traceable to the original spinal sprain. It represents a weakening of the muscular system, but back of this there are two conditions: (1) a weakening of the soft tissues from the side of tone; (2) a weakening of the circulation, and (3) a weakening of the nutrition, representing neurosis. Following these any result may be found up to degeneration of the spinal cord. In this case the change produced is a reflex one, caused by the altered irritability of the soft tissues. The primary lesion is to be traced to the vital activities of the soft tissues, particularly the muscles. The nutritive disturbances and the degeneration are secondary

results. The vital activity becomes unevenly distributed among the muscles. The result is that these muscles contract abnormally.

To reduce and correct a sub-luxation, the first thing to be attended to is to equalize the distribution of the vital activity. This is to be done by a co-ordinating treatment applied to the nervous system, the object of which is to co-ordinate the two nervous systems. The best methods of applying this treatment are as follows: (a) Relax the muscles and the ligaments in the affected region by inhibitory treatment. (b) Relax the articulations in the affected region by articulatory treatment. (c) Separation of the articular surfaces by extension. (d) Correct the lesions that are causing the maladjustment of the vital activities.

These lesions are nearly always osseous or osseo-ligamentous, because they are the result of injury or they represent chronic conditions of malnutrition. These conditions are caused by (1) anemia; (2) non-trophicity of the spinal cord; (3) a non-tonic condition of the muscles. Take spinal curvature, for example. This may be traced back to an injury interfering with the distribution of vital activity. The gradual misplacement of the vertebrae representing non-tonic and non-trophic conditions in that order. Anemia is an illustration of malnutrition and this represents one of the most prominent conditions at the foundation of the osteopathic system.

In the work of correcting these lesions there are four things to be done: (a) Relax the soft tissues in the lesion area; (b) Exaggerate the luxation. This means flexing the part affected towards the opposite side. This stretches the deep tissues, lessens adhesions and contractions. For example, supposing there is a sub-luxation of the third cervical vertebra toward the right, the first treatment would be to exaggerate the lesion by throwing the head over to the left side. If the third cervical vertebra were posterior, then throw the head forward; if anterior, throw the head backward. (c) Apply extension to the part affected, keeping up the exaggeration. For example, take the same cervical vertebra. When you have exaggerated it retain it in exaggeration, then pull it out in the same direction as you have in its exaggerated position. (d) The flex towards the side of the lesion: (1) keeping up the extension at the same time; (2) Applying pressure while flexion is taking place, right over the lesion, directing your pressure towards the opposite side.

These are the four points of treatment in connection with sub-luxations, no matter where they are located. (e) In most cases following the application of this technique, I articulate in the entire area involved. This helps to co-ordinate the eighth functional activity in that field.

If the lesion is in the cervical region, place the patient on his back during the treatment. In many cases the best results can be gained in the cervical lesions by reversing the order of (b) and (c), that is, applying extension before flexion. The reason of this is that rigidity in the neck makes it difficult to flex to exaggerate the lesion. In many cases you can correct the lesion in the cervical region quickly by following this method, because the extension:

(1) Calls forth the elastic action of the muscles, so that in flexing to the side opposite the lesion and then to the same side as the lesion you have the assistance of muscle elasticity.

If the lesion is in the dorsal region, down to the eighth dorsal, give the treatment as first given (a,b,c and d). Note here that from this standpoint the first dorsal belongs to the cervical region (in mechanics). The reasons for this are: (1) the anatomical structure; (2) the blood supply; (3) the distribution of the spinal nerves. We mean by this in connection with the nerve distribution, the first dorsal belongs to the cervical

region. (4) the vasomotor connection with the sympathetics (vaso-constriction) begins at the second dorsal. The relation of the sympathetic ganglia at the inferior cervical established the relation to the spine at the twelfth dorsal vertebra.

In treating a lesion from the second to the eighth dorsal, inclusive, we can put the patient in one of two positions: (a) Lying on the side with the head and cervical region twisted around anteriorly so as to form a curve in the cervico-dorsal regions. Of the six layers of muscles in the back we can reach only the three upper when the back is straight. To get at the lower layers we must curve the head forward. (b) With patient sitting up, head, neck and shoulders bent forward, and the arms: (1) flexed across the chest. In this case the scapulae are separated from the spine. This position is used when the scapulae are tight. (2) With the arms hanging loosely along the sides of the body. This position is used when the scapulae are loose. If the scapulae are very loose, either meet the arms behind the back, or fold the arms across the back.

(3) With the limbs separated, allow the arms to hang down between the limbs. This position is used when there is an abnormal curving of the cervical region, or the cervical and dorsal regions, for example, in what is called stooped shoulders. If you put this patient in any of the other positions you will aggravate the tension in the acromial and scapular regions. With the patient in this position, stand in front of the patient, place one arm around the patient beneath the axillae, exaggerate the lesion by flexion, then apply extension by pulling up in the line of exaggeration and then flexed to the same side as the lesion, applying pressure over the lesion. In lesions of the lumbar region you can use the same position, with arms in any one of the three positions mentioned.

(4) If the spine is what is called a straight spine (4 applied to the lumbar region and from the ninth to the twelfth dorsal) elevate the arms of the patient, stand in front, place one arm of the patient over each shoulder and with your hands in the lumbar region give exaggeration, flexion and extension as above:

THE R I B S: In the case of the ribs the same principles are applied in relation to the treatment of luxations. The position may be required to be altered to suit the condition of the body but the best position is with the patient lying straight out on his back—no pillow. Some try to correct luxations of the ribs with the patient on the side. Here there is abnormal pressure from the lateral aspect of the thorax on the opposite side, that is, the side on which the patient is lying.

With the patient on the back pull the arms strongly above the head, one at a time; as a general rule begin with the left arm. Then leave the arms lying above the head in the easy position, the position to be determined by the condition of the patient. Then place one hand in the region of the angle of the ribs involved, slightly nearer to the spine than the angle. Place the other hand on the anterior thorax, at the sternal ends of the ribs involved. Remember it is over the ribs, and not over the cartilaginous portion that the hand is to be placed.

(1) Then apply pressure between the anterior and the posterior; press from the anterior to the posterior, when you get a sufficiently strong movement of the ribs, move the rib or ribs upward or downward, according to the kind of luxation the patient has, up, if a sub-luxation; down, if a supra-luxation. (2) Increase this elastic springing movement in connection with deep inspiration.

(3) Make the patient move the arms down along the sides of the body. In this position give a number of springing movements.



The principle of this treatment is exaggeration, by using the bow characteristic of the rib, so that when you get the springing movements you correct the ribs, using the low tension as the medium of correction. Where the ribs are moved anteriorly, you require to give the greatest pressure from the anterior, and this can be best done with the patient on the face (the same principle is applied, but there is a change of position.) Where the bulging of the ribs is equal, both anterior and posterior, the pressure should be equal also. In dislocations the same principles are applied in the process of reduction, except that the hand is placed at the head of the rib, instead of at the angle.

The old principle laid down by mechanical surgery 50 or 60 years ago, was to find out the method of producing the dislocation and as nearly as possible to repeat the same principle in reduction. Get as much information as possible as to the method of producing the dislocation and as to where and how the force was applied in causing the dislocation.

Technically, dislocations are limited to the larger joints, such as the hip, knee, shoulder, elbow, one bone being separated from another, as well as the articular surfaces being separated. In a luxation there is only a slight misplacement of one articular surface in relation to another that is, (1) a separation of articular surfaces, and (2) a separation of bones.

In dislocation, therefore, we will require to change the order of treatment, similar to the treatment applied in cases of lesion of the cervical region, that is, extension by the two types of flexion. Hence, in the treatment we require: (1) More thorough and perfect extension to free the articulating surfaces. (2) It requires a greater range of flexion because the articulation of bone with bone is entirely lost. (3) In those cases in which fluid accumulations fill up the spaces left vacant by dislocations it is necessary to cause the absorption of the fluid. Sometimes this fluid becomes coagulated and forms a solid mass, for example, in the acetabulum, and this requires to be removed by absorption before the reduction takes place.

In the shoulder and arm dislocations: (1) Relax the muscles thoroughly. (2) Place the patient flat on the back without any elevation of the head or the shoulders. (3) Place the knee, or feet, in the axilla, just below the dislocation, and (a) if it is an upward dislocation, pull the arm downward and outward to an angle of 35 or 45 degrees, giving strong extension and giving slight rotation continued in the range between the right angle to the body and 45 degrees, as you pull the arm through the range of movement; (b) if it is a downward dislocation, pull the arm upward and outward, giving a similar extension and similar movement in rotation within the given range.

(4) Then rotate the arm in a circle, catching the arm below the wrist and applying the other hand over the acromial-axillary region to limit the movement of the articular structures in the joint. In giving this rotation, (a) give a circular movement first from within outward; and then, (b) from without inward, that is, give a double rotation. While giving this rotation, place the thumb and fingers around over the articulation, around the glenoid cavity, in order to feel how the head of the humerus is rotated, also to direct its movement and keep it in place when it falls into the cavity. The shoulder dislocation is one that is comparatively easy to reduce. In some cases an anaesthetic is necessary to cause complete relaxation.

In elbow dislocations exaggerate the lesion just in the same way

you would a spinal vertebra, exaggerating first; then apply strong extension with flexion in the direction opposite to that of exaggeration, and in addition give slight rotation, keeping up strong extension at the same time. The best method of getting extension in the elbow dislocation is threefold:

(a) Using the surgical principle, namely, tie a bandage around the forearm of the patient, in loop form, so that you can put the bandage (loop part) around your neck. This enables you to give extension, leaving both arms free so that you can use them in flexion and extension, with rotation; (b) When the dislocation is quite recent use the same principle as in the shoulder joint, that is, put your foot, or knee, in the axilla of the patient and pull the arm out as far as you can, applying traction on the forearm, not on the wrist.

In Hip Joint Dislocations: (1) Relax the muscles thoroughly around the pelvis, lumbar region and hip. This includes the abdominal muscles as well as the lower thoracic. (2) When the muscles are relaxed, place the patient on the table, face downward, with both lower limbs hanging over the table towards the floor, the end of the table supporting the weight of the lower part of the trunk on the anterior superior spines of the ilia. The object of this position is to get the articulation of the limb absolutely free without any weight, pressure or tension of any kind.

(3) Stand in front of the undislocated hip and catch the dislocated limb at the ankle with the other hand. (Place your knee in the angle of the knee cavity of the patient, the limb being flexed at the knee a little more than at the right angle. (5) With the inner hand hold up the hip on the side of the dislocation. (6) Apply pressure with your knee in the knee cavity of the patient's flexed limb, holding the foreleg with the other hand at the same angle as before. Then catch the great trochanter with the fingers of the inner hand, applying pressure inward and downward, and at the same time moving the ankle of the patient with the other hand, giving the limb a jerking movement downward, at the same time throwing the weight of your body on the angle of the patient's knee, by an inward and outward rotation and jerking movement of the limb from the ankle to the knee, according as the dislocation is outward or inward. Guide the movement of the trochanter with the fingers of the inner hand and apply pressure in the direction of the acetabulum.

In the Sub- and Supra-luxations of the vertebrae, the same method of correction is applied, except that in the sub-luxation pressure to steady the upper vertebra and moving pressure to move the under vertebra is applied. In the Supra-luxation, the vice versa is applied. In applying this treatment to the vertebrae we can make the application of the principle in one of two ways: (1) Stand in front of the patient sitting on the table; place the arms around the patient, catching one of the two vertebrae involved on either side of the spinous process; then apply the steady pressure with one hand and moving pressure with the other, and then give the upward extension and at the same time flexion. (2) With the patient sitting on a stool stand at the patient's side. The side you take will depend on your ability to pull or push with your fingers. Place one arm around the anterior thorax of the patient, then use the free hand to either pull or push on the vertebra, as the case may be, to be determined by whether it is easier to pull or push.

In the fourth or fifth lumbar vertebrae lesions, when anterior, you can place the patient in one of three positions: (1) Stand at the side of the sitting patient, bend the body of the patient forward as much as possible. With the patient in this position, place one arm around the patient, give an exaggerated extension from the same side on which you are

standing. With the free hand get hold of the transverse processes of the fourth and fifth lumbar vertebrae on the side opposite to that on which you are standing; then flex the body over to the opposite side and pull in a diagonal direction on the transverse processes. Do this two or three times, then rotate the body of the patient backward in giving the flexion. Now stand on the other side of the patient and treat in the same way.

(2) Stand behind the patient (patient sitting); place your knee in strong fixation in the sacral region. Then exaggerate the lesion by pulling the body of the patient backward, and then give a rotatory treatment of the body from posterior around towards the anterior. Then fix your fingers anterior to the transverse processes of the fourth and fifth lumbar vertebrae on one side and give flexion to the body to the opposite side. Then reverse the treatment, pulling diagonally as before on the transverse processes.

(3) Place patient on the back. Place the hand under the posterior superior spines of the ilia and flex the limbs of the patient, gradually increasing the flexion while applying pressure on the posterior superior spines, until you get the limbs and pelvis so placed that they will move as a unit. Then give a jerking movement of the pelvis and limbs upward, gradually increasing it till relaxation is secured and then give a jerking movement of the limb in extension.

In the posterior fourth and fifth lumbar vertebrae lesions, and in posterior lesions of the vertebra up to the eighth dorsal, place the patient on the face on the table. Catch the limbs above the knees with the hands and give strong flexion of the limbs from the hips upward backwards. Follow this by (a) the rotation of the lower portion of the spine; (b) flex the limbs and lower part of the spine straight up backwards with strong pressure over the posterior vertebrae; (c) give a swaying movement of the limbs and the lower part of the spine while applying pressure over the posterior vertebrae. Keep up this lateral swaying while giving a diagonal and postero-anterior pressure in the dorso-lumbar region.

Give the same treatment in case of an involvement of the coccyx: (a) if there is an anterior coccyx misplacement, place the finger in a laterally slanting position in relation to the coccyx, while pulling up the limbs backward and giving a lateral swaying movement to the limbs and lower spine at the same time. (b) if there is a posterior coccyx misplacement, place the finger or thumb right over the coccyx, posteriorly, and press down while elevating the limbs backward and giving a lateral swaying movement first to one side and then to the other.

(3) THE PASSIVE MOVEMENTS. Some general principles are to be noted here:

1st: Connected with these passive movements the patient is to be entirely passive, because the movement is to be a direct one in order to get a specific result, for example, in the replacing of a bone in the normal position, changing the position of a soft tissue, or moving a fluid. This must be done on the basis of the mechanics of movements.

2nd: The movements in this case appeals entirely to the involuntary system. In some cases the results obtained are voluntary, but in this case the voluntary is reached through the involuntary. Some writers call this type of treatment "involuntary reflex". It is not necessary to make such a distinction, however, because the movement itself is passive and it is better to look at the movement from the standpoint of its application than from the standpoint of its results.

In all the passive movements there are two essential principles

involved and these principles must be carried out,

1st: To secure the relaxation or contraction of soft tissues so as to restore them to their normal physical consistency and physiological irritability and mobility. Here we are dealing not only with the physical but with the physiological conditions, the alterations in these conditions as found in connection with lesions, producing an equality in the distribution of the vital activity. In this sense the effect is voluntary because it reduces the vitality or disturbs its distribution. In producing this relaxation and contraction inhibition and stimulation are used, inhibition always first if a muscle is over-contracted or over-relaxed. This is to appeal to the physical characteristics primarily.

2nd: The extension of the ligaments and bones so as to separate the articulating surfaces to furnish free play for the articulating structures and to bring into activity the elasticity of the soft tissues. This elastic action (physical) calls into exercise irritability, (physiological characteristic) <sup>and mobility</sup>. This is wherein the passive movement differs from the reflex movement, reflex action implying an appeal to the vital activities directly, whereas the physical appeals to the vital through the physiological.

In the passive movements, then, we reach the vital activities through physics, namely, the physics of (a) consistency, (b) elasticity, and (c) cohesion on the molecular plane. These represent the three physical aspects of the muscle tissue and this is the reason why all these movements are distinctively passive, because we are appealing to the physics of the soft tissues. The application of the passive treatments is made directly to the part to be treated; therefore, the result of passive treatment is primarily physical, secondarily physiological and vital. The objects of such a physical treatment are:

1st: To promote the physical circulation of the blood. This implies a knowledge of the physical principles of circulation, the principle physical point being elasticity of the vessels and the tissues.

2nd: To promote the physical circulation of the lymph. The principal point in the physics of the lymph is the blood pressure, that is, capillary blood pressure based on elasticity. The object in both of these cases is: (a) to increase the rate of the circulation of the fluid itself, and, (b) to promote the absorption or reabsorption so as to take away the excess of fluid and equalize the circulation of the fluid left.

3rd: A physical effect reaching the tissues is to promote or stir up the physical principles of the tissues. The physical principles of muscle tissue are: (1) consistency, (2) cohesion, (3) extensibility and elasticity in combination. In dealing with tissue, as tissue, we reach it physically: (a) by a direct type of treatment applied to the tissue itself. (b) We secure an indirect result on the tissues through the fluids, that is, the blood and lymph, referred to above as (1) and (2). Hydrotherapeutic means, for example, of baths, packs, to use heat and cold, etc.

4th: Indirectly the passive treatment may reach and therefore affect the nervous system by reaction, (a) through the medium of the fluids of the body. The meaning of this is that excessively venous blood in relation to the nervous system stimulates or over-stimulates; consequently, if you direct the venous blood to a part that you wish to stimulate, or over-stimulate, you can reach the nervous system in this-passive way by a passive treatment. This is a condition that we find present in many cases of diarrhoea. This, we will find, is one of the most important means of getting at the nervous system from the stimulus side; (b) through the tissues in which the nerves terminate, or through which they pass. For example, we

can reach the motor or sensory nerves that terminate in the muscles, or the nerves that pass through ganglia, or the glands of the body and we can stimulate directly by passive treatment.

These are the four points that must always be kept in view in giving the passive movements. Hence, passive movements are means used in the attempt to accomplish an ultimate corrective result.

### THE PASSIVE MOVEMENTS:

I. PRESSURE. Direct movement applied to the superficial veins or the lymphatics. The direction of this movement should always be towards the heart and the method of its application is a slow pressure over the tissues, veins or lymphatics. The depth of the movement should gradually be increased, for example, this treatment is applied in cases of pain, to relieve the blood type of pain by relieving the static condition of the fluids, either blood or lymph. This treatment is applied slowly, (a) to prevent superficial irritation, the irritation of the sensory nerves causing sensitiveness and often aggravating the pain; (b) to prevent a local irritation, the local irritation arising from a development of the excessive heat, or by direct irritation of the sensory nerves.

To apply this movement place the part to be treated in a position so as to be free for the action of the force of gravity. Here we use the force of gravity as a physical principle to aid the circulation. For example, in treating the throat, in common sore throat, do not, as is so often done, incline the head backward, but rather forward, because in a cold or sore throat, the muscles affected are the sterno-mastoid and the hyoid muscles. If the head is bent back these muscles will be tightened even more than they are as we find them in the patient and this rigidity of the muscles acts as a resistance to the flow of venous blood. Here we want to get the force of gravity in the venous blood of the jugular circulation, to do this we throw the head slightly forward, relaxing the tightened tension of the muscles on the blood vessels.

Having placed the patient in the freest position for the action of gravity, apply the movements of pressure in one of two ways: (a) in the direction of the heart in the case of the venous blood, and (b) from the lesser to the greater calibre of the vessels. This applies only to the venous blood and lymph. This movement does not apply to the arterial blood; if applied to the arterial blood system the direction would be from the greater towards the lesser calibre.

As a general rule we do not deal with the arterial blood in the passive movements, but in the active and passive reflex movements. The reason for this is that passive treatment of the arterial system generally damages the blood system. There is one exception to this rule, and that is in the thoracic and abdominal aorta. When we want to mechanically assist the heart to drive the blood through the systemic circulation, for example, in valvular disturbance, aneurism of the aorta. The reason for these two types of this treatment is that in both cases we are assisting the force of gravity, for example, passing from greater to lesser pressure follows the path of the arterial blood.

II. KNEADING. This movement is applied primarily, to the skin and subcutaneous surface with a view to reaching, secondarily, the subcutaneous tissues. The object of kneading is to (a) relax the contracture of the soft tissues; and (b) to assist in driving out over-accumulations of fluids, and in establishing normal tone and circulation in muscle and soft tissues. If our aim is to relax contracted tissues, we require to give

inhibitory treatment before the kneading.

This kneading treatment may be applied in several ways:

1st: Grasp the muscle between the finger and thumb, then give the muscle a rolling movement in a circular or semicircular direction. Remember in this movement to move the skin and muscle together; it is not enough to move the parts separately. 2nd: Knead with the soft cushion part of the fingers or the hand at an acute angle to the skin and give a slight rolling movement in a circular or semicircular direction, not over the surface of the tissues, but through the tissues.

In order to give the kneading movement properly the arm of the operator should be stiffened at the wrist and the kneading movement given only from the wrist down. The reason for this is that we use the swaying movement, taking in the entire forearm and here there is too much pressure brought to bear on the local tissues, the treatment being made in reality a stretching treatment. In giving this movement the kneading is to be applied to a superficial part of the body, especially along the paths of the veins and the superficial lymphatic circulation.

The main principle to apply is to direct the kneading towards the freest movement of the muscle or of the other tissue that is involved, for example, in kneading the spinal muscles the movement should be always outward and upward and the movement should be applied slowly. This applies only to the spinal muscles. In all other parts of the body you can apply the kneading movement more rapidly, provided you do not add to it pressure. Determine the weight of application of the kneading movement in general by the freedom of the muscle; if the muscle is free give more movement and give it more rapidly; if the muscle is bound, that is, tense, give the movement slowly.

### III. THE STROKING MOVEMENT. Massage calls this "Effleurage."

The method of application is different in the osteopathic system, but the principle is the same. This movement is always given in the direction of some fluid movement, the main direction being towards the heart.

This movement is applied particularly to the superficial veins, lymphatics and surface fluids. By surface fluids we mean pathological fluids, for example, in the dropsical conditions. This treatment may be applied indirectly to fluids that are not on the surface. The stroking movement may be either superficial or deep. (a) Superficially it is applied very lightly with the cushion part of the tips of the fingers, in some cases with the tips of the nails of the fingers, for example, on the head and scalp. The object of the stroking movement is primarily to get a soothing sensory effect. (b) If the stroking movement is deep considerable force and pressure should be used. When the movement is deep it should begin lightly and gradually increase in force until the effect desired is produced.

The main use of the superficial stroking movement is to soothe, rather than to relieve pain, especially by stroking over the sensory nerves, or their terminals in the skin, for example, in neuralgia of the face give a light stroking movement over the path of the muscles or the field of distribution of the fifth cranial nerve. Use the cushion part of the fingers, laying down the fingers at an angle of 45 to 60 degrees.

In the deep stroking movement use the same technique, but move slower and with greater force, because if this movement is given quickly and at the same time forcefully, it will develop heat and redness of the skin, which will aggravate, instead of relieve conditions. In applying the superficial stroking movement to the arm, the hand and the limb, begin at

the extremity and move upwards towards the trunk. In applying the deep stroking movement to the extremities begin higher up and move down and away from the trunk, for example, in case of effusion of the forearm, if the patient is lying down put the arm on a level with the body; if sitting up raise the arm to the horizontal level of the shoulder before giving the stroking movement. If deep movement is used begin higher up in the arm and go down to the extremity and then go up again.

The deep stroking movement is applied to the intestines, unless in cases of superficial abdominal dropsical conditions. The kneading movement is not a good movement for dropsy because this movement tends to produce infiltration. In applying this movement to the intestines, begin on the right side, pass around in your movement to the left side and then pass back from left to right. In giving this movement to the intestines allow the fingers to move freely over the skin without dragging the skin, at the same time give deep pressure. Sometimes the skin is exceedingly relaxed on the abdominal surface. In this case you are required to hold the skin with the other hand to prevent the skin from dragging.

The stroking treatment is also applied to the neck, for example, in case of congestion of the head, neck and throat. The direction of the movement should be downward and away from the head. In anaemic conditions of the head, for example, anaemic headache, the stroking movement should be upward. In neuralgia of the face the movement should be downward. In neuralgia of the neck the movement should be upward, because in neuralgia of the face we are dealing with a superficial anemia; in neuralgia of the head with a deep anemia.

In giving the stroking movement one or two deep stroking movements are better than a larger number of lighter movements, because the latter have a tendency to irritate and also to produce heat. In cases of chill give the stroking movement along the entire length of the spine on both sides of the spinous processes, simultaneously and in this case give it rapidly. For example, take two fingers, place one on either side of the spinous processes, (a) beginning in the suboccipital region move down to the coccyx; then give the same movement upward towards the head; (b) repeat this quick superficial stroking movement four or five times; (c) in a similar way give a deep stroking treatment along the spine, slowly. This is one of the best methods we have of dealing with a general chill. This does not mean a malarial chill, because in that case the treatment is specific at the seventh, eighth and ninth dorsal. This is in line with the Indian method of treating a chill, which was to cover the back of the patient with a blanket and run a hot rock up and down over the spine, that is, through the blanket; (d) articulate the spine from above and then vice versa, in a general chill. In a malarial chill do the same thing at the seventh, eighth and ninth dorsal.

IV. THE TAPPING MOVEMENT: This is called in the field of massage "tapotement". This movement can be applied with the fingers or the hands, in the latter case with the hands open or closed. In either case the hand should be loose from the wrist, in order to give as much elasticity as possible. This differs from the kneading movement in the fact that in kneading the wrist is rigid, here it is loose and the wrist is used as a free hammer movement. When the movement is given with the open hand use the tips of the fingers, or the knuckles; when given with the closed hand use the solid part of the hand. This movement can be applied to any superficial part of the body, for example, in treating the spine have the patient lying on the face and give the treatment upward or downward, according to the rules laid down before.

In treating the abdomen have the patient standing erect with the hands locked behind the head. In treating the liver have the patient standing erect with the arms folded lightly across the chest. In treating the chest have the patient standing erect with the arms hanging loosely along the sides of the body, or with the arms folded across the back, the latter applicable in a sunken chest.

The object of these tapping movements is to set into vibration the muscles and other soft tissue structures. The result of this will be: (a) to stimulate the cyclical contraction of the muscle; (b) at the same time to arouse the action of the sensory nerves; for example, in semi-paresis of the intestines and in a progressive paralysis in the limbs and arms; (c) the final net result will be to increase the rate of the circulation of the superficial fluids, for example, the blood, the lymph, or the muscle fluid. In the case of dropsy of the lower limbs.

V. THE SHAKING, SHAKING AND ROLLING MOVEMENT: This refers to the shaking movement itself, or the shaking and rolling movement in combination. (a) The shaking movement is applied principally to the throat and to the long muscles with a free range of action. Use the finger and thumb, grasping the muscle or the throat between the two, shaking quickly by beginning slowly and increasing the rate. In this movement give the weight and pressure of the arm to the elbow, similar to kneading.

The objects of this movement are: (a) to stimulate the resorption of fluid accumulated in or around the tissues; (b) to stimulate and strengthen the muscle action; (c) to lessen or inhibit pain; (d) it is applied in congestion and inflammation to increase the excretion of fluids; (e) it is applied to the glands to stimulate the increase of their secretions, for example, it is applied to the larynx and pharynx. Place the finger and thumb on either side of the larynx close up to the root of the tongue; give a quick movement upward and at the same time shake from side to side. This pushes and pulls the larynx and pharynx upward, stimulating the entire throat and visceromotor, and especially arousing the salivary glands (secretory). A similar effect is gained in relation to the sublingual and submaxillary glands by pulling out the tongue as far as possible (do not pull it out by the root) and then shaking it. This treatment is also called for in cases where the throat is involved, for example, in diphtheria and croup. This is the best treatment for relieving congestion at the root of the tongue and upper part of the throat.

In diphtheria, bronchitis and inflammatory conditions of the throat, especially in inflammation of the trachea, both of these movements should be given. Catch the trachea between the finger and thumb, above the level of, or below the level of the thyroid cartilage, pull slightly upward, then shake from side to side with a somewhat rolling movement anteriorly. This same treatment is applied in hoarseness and croupy conditions. The effects are two-fold: (a) directly on the trachea itself; (b) we reach the laryngeal branch of the pneumogastric nerve and this is the nerve that supplies the larynx, its muscles and contiguous structures (viscero and vaso motor).

When the bronchi are involved, for example, in bronchitis, catch the trachea just above the sternum, with the patient sitting on a stool, apply pressure with one hand forward over the transverse processes of the seventh cervical vertebra; at the same time throw the head slightly back, with the other hand and pull on the trachea so as to throw the throat into prominence, then: (a) give slight shaking movements from side to side; (b) give a slight jerking movement, so as to effect the upper part of the trachea and the bronchi; (c) pull the trachea upward two or three times in



rapid succession. This treatment will stimulate the bronchial tubes. The effect of the same can be increased as an increase is demanded:

1st: by stimulating the respiratory function at the fourth and fifth dorsal, where we reach respiration directly through the pulmonary plexus;

2nd: in difficult and serious cases give a treatment to raise the thorax. In this case you generally require to give your treatment with the patient sitting because asthmatic symptoms will often develop with the patient lying down. Hence with the patient sitting, stand behind him and place your knee against the upper part of the spine; then place one hand on either side of the ribs, anteriorly, and raise the thorax upward against the pressure of your knee. If the patient is lying in bed get your fingers behind him, patient on the back, place the other hand on the anterior and lateral aspect of the same side of the thorax, and while you push upward from the posterior push diagonally from the side, holding the anterior portion of the thorax firm.

The shaking movement is also applied to the stomach, with the patient standing, the hands locked behind the head; catch the stomach between the fingers and thumb, midway between the ensiform cartilage and the umbilicus, beginning so as to catch the stomach just below the pyloric orifice, and give the shaking movement from side to side, for example, this treatment is applied in cases of gas formation; dilated stomach and where the stomach is inactive. Normally the stomach should never be completely filled. If it is completely loaded it lies dormant. In this case the shaking treatment is the best treatment to give,-- of course palliative. When the stomach is completely filled it is prevented from moving and this either stops or checks digestion, with bad results. The movements of the stomach are (1) propulsive, (2) churning and (3) pendular. If these are stopped, reaction takes place on the other viscera, especially the heart.

The shaking movement is also applied to the bladder. Place the patient on the back, with the limbs well flexed on themselves and on the abdomen; place the finger and thumb on either side of the bladder, just above the pubic arch. Before trying to catch the bladder always give a treatment to pull up the abdominal contents from the pelvic region. Begin in the inguinal region on both sides, applying pressure gradually upward toward the hepatic and splenic flexures, the same treatment as would be given in enteroptosis.

This shaking treatment is applied to the bladder in paralysis of the bladder, for example, in retention of the urine, when it is not specific in its nature, but is due to paralysis, either partial or complete, as in some of the febrile conditions. In most of these cases a very light shaking movement will overcome the conditions entirely, relieving the spasmodic condition entirely,--relieving and allowing the bladder to resume its normal movements. This treatment is also applied in inflammation and dilation of the bladder. Dilatation of the bladder is, like dilatation of the stomach, the result of a mechanical-chemical action. If the bladder is over-filled the normal mechanical stimulus is lost, because it is dilated so much that any mechanical change in pressure is impossible. The shaking movement is applied to take the place of the normal mechanical movement of the bladder. The chemical stimulation of the acid contents of the bladder will follow after the shaking has been applied.

The Shaking and Rolling Movement in Combination: This movement is applied especially when we wish to free structures subject to adhesion. This is one of the most important treatments in Osteopathy, because it applied to such organs as the uterus, the ovaries, the liver, the spleen and the stom-

ach. In giving this treatment give: 1st, the shaking movement; and 2nd: follow this by giving the rolling movement. The shaking movement is the same as above.

The rolling movement is given by catching the organ at its most dependent part. By this is meant that each organ is suspended and the dependent point is just below the suspension. Give the rolling treatment in a semicircular movement on the long axis of the organ. For example, in the case of the stomach, catch the stomach at its pyloric end, rotate or roll towards the left side because that is the long axis. In the liver give the movement in the opposite direction, in the form of a lateral-horizontal movement. In the spleen roll towards the left.

In the ovaries it does not make much difference to which side you roll the organ. It is better to take the ovary as a horizontal body lying across the abdomen and give it the rolling movement up and down. In the uterus the movement should be horizontal, and remember that the rolling movement is always to be given to the right side because the ligaments on the right side are longer than on the left, that is, the longer axis of the uterus is towards the right. To aid this rolling movement in case of adhesions flexion and rotation of the limbs may be used effectively.

VI. VIBRATION. This is one of the most important means used in the mechanical field because it is in line with nature. Nature vibrates and pulsates everywhere and THIS IS ESPECIALLY TRUE WITHIN THE HUMAN BODY. Vibration is the order of nature in connection both with nature's structures and her physical forces. There is no part of the human body that does not possess its own vibration. Some writers except from this the process of osmosis. We could not have any osmosis in the physiological and physical construction of the body were it not based on vibration. As a movement, vibration is in the nature of a delicate shaking movement. It may be applied by the palmar surface of the hand or the fingers.

In applying vibration lay down one finger or hand and vibrate with the other finger or hand on top of the first. The first finger or hand acts as a medium between the second finger or hand and the part to be vibrated. The first finger or hand is to be kept firm or solid without active movement, because, 1st, this enables you to give sufficient pressure over the part to be vibrated, to make it readily responsive to vibratile action, that is, it circulates vibration; 2nd, it gives uniformity to the vibration, the transference or transmission from the second hand or fingers to the first and thence to the tissues, changing an irregular into a regular movement of a delicate character.

In applying vibration give the weight and pressure from the wrist only, to the vibrating hand. Vibration is applied: (a) in cases of pain, to relieve pain; (b) to promote resorption, especially in acute congestion and chronic inflammation, and where the fluid has become coagulated; (c) to break up adhesions and to soften the adherent matter; (d) to stimulate the rhythmic action of tissues or organs that have rhythm. The vibration is seldom given to the heart. The rhythmic organs to which it is given are the liver, spleen, kidney, pancreas, stomach and intestines; (e) In acute inflammatory conditions, especially involving the serous membranes, for example, in peritonitis, pericarditis; (f) It may be applied to such organs as the eye, the throat, enlarged glands, as goitre or lymphatic enlargements, in hoarseness due to congested condition of the mucous membrane. It is also applied to the thorax when the muscles are congested over the ribs, also in pleurisy, pulmonary congestions, pneumonia, congestion of the lungs, as in gripe.

In vibrating over the lungs: 1st. lay the hand down on the anterior thorax with the fingers pointing towards the apex of the lungs, vibrating over the apex first, then turn the fingers to point towards the diaphragm and vibrate downward.

In applying vibration to the heart, vibrate only at the apex of the heart located about one and one-half to two inches from the median line between the fifth and sixth ribs. Do not vibrate over the heart in the stoppage of the heart beat. Vibrate over the heart in the following cases, at the apex only: (a) When there is a weak heart action. (b) When the heart is beating apically behind the ribs, instead of between them. (c) When the pulsation is away from the chest wall, that is, when no perceptible apex beat can be found. Never give vibration to the heart that is liable to collapse. In applying vibration to the heart, apply it with the patient lying on the back.

In vibration over the abdomen apply it lightly to relieve the pain of colic, diarrhoea, or dysentery; also in the early stages of peritonitis, typhilitis and peri-typhilitis.

Vibrate for ulcers or abscesses involving such organs as the liver, etc.

In vibrating over the head try to reach the circulation of the brain substance, for example, vibration along the sinuses, especially the longitudinal sinus to reach the venous blood, also over the sutures. Vibration applied to the scalp causes the scalp to contract, and this, according to Head's Law, causes a reaction to be produced upon the blood vessels inside the cranium. This relieves congestion of the head by relieving the inactivity of the blood vessels and causing an increase of tonic action.

In vibrating over the eye use one finger over another as a medium. Vibration is applied to the eye to relieve congestion of the eye. It also relieves muscle tension and is used in anaemia of the eye to increase the circulation of the blood through the eyes. One point to be noted is that vibration is not to be applied to the eye in case of dilation. Dilation is overcome- 1st, by inhibition at the second, third and fourth cervical vertebrae; and 2nd, by stimulation at the seventh cervical and first, second and third dorsal.

NERVE VIBRATION: This is applied by the fingers in one of two methods: 1st. By what is called the "Harp Method", that is, friction by the fingers transversely across the nerve, for example, in paralysis of the fingers, or in cramps. In applying this stretch the arm out at right angles to the body and catch the nerve as it comes out at the axilla. 2nd, The "Guitar method". In this case use the nails or the tips of the fingers over the nerve. The first method is used in connection with the large nerves, or those that are easily accessible; the second method in connection with the small nerves, especially the branches of the Fifth Cranial Nerve, for example, the supraorbital and infraorbital, and the superficial sensory nerves of the scalp, face, or any surface of the body in anaesthesia.

This type of vibration is applied: 1st- To lessen pain, for example, in facial neuralgia and sciatica. 2nd- To stimulate the contraction of muscles (superficial) and to increase the tonic action of the blood vessel walls. 3rd- It is used in the case of a dull heavy headache when there is a sense of weight. Here frictional vibration is applied to the scalp and the sympathetic ganglia along the spine.

4th- It is applied to the spastic condition of muscles following paralysis, for example, in spastic paraplegia following paralytic conditions. Test the patient for a sensory response; if you get it, begin at once to

apply the nerve vibration. Your best method to get a sensory response is to use heat of some kind, any method of applying heat, sufficiently delicate to enable us to distinguish between sensory and motor paralysis. For example, the delicate heat pencils may be used.

5th- It is also applied to the secretory glands for the stimulation of the gland secretion. For example, stimulate over the facial nerve so as to reach the submaxillary gland, or the chorda tympani to increase the salivary secretion. Remember, in this connection, that the brain is a gland and can be treated at its base in the same way.

6th- This treatment is also applied to decrease the temperature and to decrease the sweat secretion. It is applied over the lower cervical nerves and over the lower lumbar and sacral nerves at their exit from the spinal column, e. g., in case of cold hands or feet.

7th- It is also applied in hiccoughs over the phrenic nerves in the cervical region. Also in spasms of the diaphragm.

8th- It is applied in fainting from partial syncope caused by the stoppage of the heart in diastole. In this case keep the patient flat on the back to reduce the gravity weight of blood, then put a small cushion or pillow under the shoulders of the patient to relieve the blood pressure from the heart and then vibrate over the heart reflex area between the third and fifth ribs, right over the thoracic heart itself.

9th- Vibration along the pathway of the longitudinal sinus to reach the upper portion of the corpus callosum. This is applied to reach the blood supply of the brain and is applied in this way because it represents the largest blood field inside the cranium. For example, to equalize the blood supply in the two hemispheres in the brain in case of congestion of both, or in partial congestion of one hemisphere.

10th- Vibration along the sutures of the brain, for example, in children whose heads are partially deformed as the result of instrumental delivery at birth, or from other causes, such as rickets. Vibration here causes the ligamentous structures to become tonic, the elasticity of the ligaments altering the shape of the head. To prevent the deformed head in parturition inhibit every second pain, at the articulation of the ninth and tenth dorsal. This will tend to elongate the head by slowing the process of delivery.

11th- Another application of vibration is in case of bowlegs. Vibration here is applied along the entire length of the long bones, the limb being laid out so that the bow is uppermost. Here the vibration reaches the marrow of the bone and increases its activity, which causes a change in the nutrition of the limb and tends to strengthen the bone.

Nerve vibration has been recognized for a long time as a valuable means of accomplishing definite results physiologically. These results are undoubtedly valuable from the therapeutic side. Some doubt the osteopathic value of vibration. Both in the corrective and palliative field, however, its value is undoubted. Some claim that they get better results by the use of an instrument. If it is used, as it can be, to correct vertebral, rib, muscular lesions, to relieve pain, etc., then such vibration is simply a labor saving means. And in this age when human life is so liable to be sacrificed any life saving agency is valuable. The question is not, instrument or not instrument, but the principle implied and the object to be attained.

Under the caption, "THE HUMAN NERVES MASSAGED BY HAND," the Ohio State Journal, published the following, March 15th, 1900:

"Among the great advances that will be recorded during the new century is that of an entirely novel treatment of human ills by means of

direct massage of the nerves. In Bonn, Germany, three patients who were beyond all power of resuscitation by the usual means, after succumbing to the effects of ether, were revived through the action of nerve vibrations over the heart, one of the radical attendants having tried, with complete success, this plan of saving life when the patient was at the last gasp.

At the Post Graduate School here in New York the discovery is now being utilized in the electric department. It has been shown that the electric batteries previously used for the purpose of stimulating the nerve powers are not needed. The work that the batteries did can be done better by hand. With marvelous skill the electro-scientist locates the nerves with his finger and then gently taps the spot until the life returns to the nerveless body. It is necessary to have a thorough acquaintance with every nerve before the skill of the doctor can be exercised in imparting new life by means of nerve vibrations, and this opens up a specialty in medical practice that will redound greatly to the benefit of the medical profession, as well as to the suffering.

There are certain complaints in curing which drugs have been of little use, such as pneumonia, tuberculosis, typhoid fever and various diseases of children. In these ills it has always been a fight between the constitution of the patient and the inroads of the enemy. All that could be done was to keep up the strength of the patient and help him to fight a winning battle.

This is where the new discovery of nerve vibrations will possess incalculable advantages. They assist the patient to fight by giving him the muscles of a strong, well man on his side. The nerves are nerveless from exhaustion and the patient is on the point of succumbing to the coma that follows an ineffectual fight with deathly weakness. To give the patient strong tonic drugs is like cutting off the masts of a sinking ship; it keeps like in the hulk for a little longer, but leaves the patient in worse shape to stand the attacks of the disease. The nerve vibrations, on the other hand, act just as the sufferer's own nature would, had it the power to act at all. The nerves are given new life without the patient's waning energies being taxed at all, and so the entire system is rejuvenated and the sick one acquires power to renew the battle until the crisis is passed and his own strength is sufficient to carry him on to the convalescent stage.

The advocates of this new method of treatment claim also that the fountain of perpetual youth comes nearer to discovery through its use than by any means heretofore advanced. By massaging the nerves of the aged, the blood is sent circulating with renewed vigor through the veins, exhausted tissues are replaced by vitalized ones and the infirmities due to the loss of nerve force are vanished. The sluggish circulation of the old person is given new life, the heart beats with force and vigor again, the digestive organs, relieved of the necessity of imparting direct action to the nerve tissue, pursue their functions with increased activity and the one who is in the "sere and yellow" and has begun to look forward to a wretched old age of failing health grows young again.

It is exhausting work to massage the nerves of the patient and what the patient gains the operator to some extent loses. That is why nerve vibrations will always be rather a costly method of treatment and also why physicians who are aware of their valuable properties are averse to informing their patients. The administrations of nerve vibrations takes considerably more time than to write prescriptions. A physician who attends to his patients by application of this method, must not treat more than eight to ten cases daily, while prescription writing will permit an office practice of from 30 to 60.

It has been suggested then an institution be founded exclusively for the study and practice of this new curative agent. Here the patients could be treated and watched so as to make the advancement of the new science as certain as possible, and medical men who wish to learn the new method of treatment may have a central institution where they can give their entire energies to the study.

The nerve vibrations are known only by some practitioners, as for instance, old Dr. Sayre, who has treated after this method. Dr. George Schoeps, throat and nose specialist, applies the vibrations after cauterizing to subside the following inflammation. Dr. H. V. Barclay says in the Medical Times of March, 1899, in his paper, "The treatment of Chronic Heart Diseases by Baths and Exercises"; "Vibration over the region of the heart, and pressure on the vagus nerve, are administered to exert a special influence on the heart itself. Part of this action is, of course, produced by contact with the skin, but the effect is so pronounced, that it would be unreasonable to deny that the action is not produced by direct influence on the centers of the heart itself, and through them by reflex action on the cardiac and vaso-motor centers of the brain."

Dr. T. F. Morton, on the other hand, came to a wrong conclusion in making the statement that he could produce nerve vibrations by electric batteries. Dr. J. Mortimer Granville, of London, in his book, "Nerve Vibration and Excitation," proves intelligently and positively, that the nerve tissue is only a good conductor of electricity, but that the latter can by no means cause nerves to vibrate.

There is probably only one physician in the country who is using this method at large and made it his specialty without administering any drugs or electricity, or massage in addition to his treatment. To him we are indebted for the knowledge of it. He became introduced to his practice through a high standing, elder colleague, who requested his treatment for himself, his wife and two of his own patients. With those his success spread. After more than eight years' practice, the doctor can proudly and truthfully say he never has lost any patient by death. The treatment proved of the utmost value in tendency to apoplexia, by strengthening the walls of the small blood vessels, regulating the circulation and preventing thereby any stroke of this fearful disease.

How powerful this treatment is may be seen, for instance, by the fact reported in the New York Tribune some years ago, that in three operative cases in Bonn, Germany, when the patients could not be resuscitated from the influence of ether and chloroform, one of the assistants tried nerve vibrations over the heart for thirty-five minutes. This was done after all other efforts had failed, and the patient was actually brought back to life, and the heart resumed its normal action.

A noted physician of Europe, Dr. A. Kellgren, read in 1888, a series of papers about "Manual Nerve Treatment," before the surgeons of the Imperial Austrian navy at Tula (printed and published by order of the secretary of the navy) and reported especially favorable results attained through application of nerve vibrations in diseases of the lungs, heart and stomach; in mastitis, endometritis, uterine hemorrhages and atony; in neuralgia, sciatica, migraine, and paralysis infantilis; in liver (gall stones) kidney and bladder trouble. According to his experience this mechanical method, which must not be given with machines, produces: (a) Strengthening of the nervous energy; (b) mitigation of pain; (c) contraction of the small blood vessels; (d) impulse of the muscles to contract; (e) augmentation of the secretions of the glands.

There cannot be the least doubt that we possess with the nerve vibrations a most powerful weapon against the progression of almost all diseases of the nervous system, and a sure cure for most of them. A farther advantage of this treatment is its direct action upon the nerve tissue, sparing so entirely the digestive organs as medium."

We have quoted this article in full to call attention to a number of points. (1) It illustrates the point we have made before that there is a tendency to anti-drug systems of therapy, in the desire to get back to the methods of nature. (2) It brings out the general ignorance of the existence of osteopathy and its claims as a system of healing. (3) It brings out very strongly the advantage of manual manipulation, which on a scientific basis is the method of osteopathic treatment. The writer says there is a demand for this medical specialty, and for a school and hospital in which the study and practice of this new curative system may be carried out with a view to its proper testing and application. There are already hundreds of reputable practitioners of this art in the field, and several schools in which it is taught as a distinctive system.

The writer seems to think that it is nerve vibrations alone and that the method is that of massage. Neither of these ideas is correct. Manual manipulation is, (1) corrective, in the case of any tissue or organ misplacement; (2) stimulative or inhibitory of any force, fluid or tissue of the body. The stimulation of a nerve, either directly or indirectly, may produce an acceleration or inhibition effect upon the nerve, the nerve cell, other nerves through the nerve cell connection and the muscle attachments of the nerves. In all these cases it is not a question of vibration alone, although change in the vibratile characteristics of the nerve or muscle may be of importance, but a question of modified activity in the tissue involved, resulting in lessening sensation as in pain, strengthening the nerve force, dilating or contracting the blood vessels, increasing or decreasing the rhythm of an organ like the heart or liver, of the muscles, or of the secretory and metabolic functions, as well as the absorbent powers of certain tissue, gland or membranous cells.

The writer seems to think this idea is limited to a few and that it is applied only by a few men. We have evidence that the idea is becoming widely recognized, the manual treatment of the Royal Central Institution at Stockholm, representing this principle systematized in Europe and Osteopathy representing it in America on a definite physiological basis. In many other quarters we find the recognition of the same principle, for example, the Brandt and Ziegenspeck method of manual treatment applied in gynecology, the Lucas-Championnière method in mobile surgery, etc. These all indicate the trend of thought away from drug systems and the determination to build up a system on an entirely physiological basis such as we find in osteopathy. It undoubtedly means new life to the nerve and muscle tissues, new force imparted to a sluggish circulatory system, economy in the digestive apparatus, without dragging out the life force by means of stimulating drugs.

**VII. THE STRETCHING MOVEMENT.** This movement is applied principally to the muscles. The primary object in stretching a muscle is two-fold:

1st: To relieve the congestion or semi-congestion of the muscle. Here the muscle fluid has coagulated. The muscle is composed of solid and fluid, 60 to 70% of the latter; the muscle fluid coagulates by increase of the fluids preventing fluid movement and by accumulated heat. There are five different proteids in the muscle substance, the myosin being the basis of coagulation, hence where there is an excess of myosin there is a tendency to coagulation, for example, we find this in fever patients; it is also

found in the extremes of heat in tropical climates.

And: To compress the blood vessels and by reaction from this compression to stimulate the nerves so as to restore the muscle to normal tonic and trophic condition. In this case the reaction from the stretching is what is wanted. This reaction tends to increase the flow of blood to the muscles and as a result to increase its nutrition and trophicity.

As a general rule, all muscles should be stretched before applying a specific treatment to them- (a) to relax the muscles; (b) to relieve the nerve and blood supply so that they will be responsive to treatment.

Muscle stretching is applied to the muscles in the neck; to muscles in the upper and lower extremities and to the muscles along the spine. The method of its application is two-fold: (a) To catch the muscle at the middle and pull it out in both directions, as much as possible; (b) In the arms and legs the stretching can be best done by extension plus rotation outward or inward. This puts the nerves as well as the muscles on a tense stretch and gives the maximum of stretching to the muscle. This is the most effective means of producing relaxation.

**VIII. EXTENSION AND FLEXION:** This movement consists of pulling out the soft tissues and articulating the hard tissues, such as ligament, cartilage, bone. It is applied for the following purposes: (a) To loosen the stiffness of joints, for example, in rheumatoid arthritic joints; (b) to break up adhesions and remove accumulations and deposits; (c) to increase lymphatic and venous circulations. Note-where that if pain is present in applying articulation the extension and flexion is contra-indicated.

This movement is applied to head and neck with the patient lying on the back or sitting upright. Place one hand on the forehead, the other at the base of the occiput, then pull on the head gently and lightly, at the same time give a slight lateral movement. In giving this movement do not use sufficient force to move the body. This movement is applied to the head principally to help to accelerate the flow of blood out of the head. Vibration is the best method to relieve pain previous to giving the extension and flexion, beginning away from the point of pain and vibrating towards the point of pain.

This movement is applied to the neck with the patient lying on the back. Place the tip of the longest finger on the first rib underneath the clavicle, the thumb on the transverse process of the vertebra anterior, the cushion part of the hand at the angle of the jaw, then push between the cushion part of the hand and the tip of the finger, using the thumb on the vertebra to cause a slight rotation. This draws the blood away from the head and lessens the stiffness of the neck.

This movement may also be applied to one side of the neck. Standing at one side of the patient, placing the fingers of one hand on the transverse processes of the opposite side of the neck and placing the other hand over the forehead and lateral aspect of the head on the same side on which you are standing, apply pressure on the transverse processes, toward the side on which you are standing, pushing the head over to the opposite side and giving a slight rotation with both hands in opposite directions.

This movement may be given to the neck along with kneading and vibration for rheumatism, mumps, etc. It is also used to relax the costal cartilages; the sterno-clavicular articulation in connection with the attachments of the ribs; in tubercular pleurisy and pneumonia.

This treatment is also applied to the shoulders. With the patient sitting, the operator standing in front of the patient; place the finger and thumb across the shoulder at the acromion process, then grasp the wrist



of the patient with the other hand, pulling the arm up above the head and then pulling it straight out and downward slowly until it is at right angles to the body.

This movement may be applied to reduce a dislocation of the head of the humerus and even after the reduction of the dislocation this movement must be kept up gently every day for three or four weeks to keep the soft tissues relaxed and tonic and to prevent stiffness of the joint. Remember that a plaster cast is not to be used but a light bandage supporting the arm around the neck from the elbow with the fingers laid lightly on the scromion process of the opposite shoulder. The bandage to be removed at each treatment. This same treatment is applied in congenital hip disease and may be used as a post-reduction treatment. The Osteopathic treatment, or principle, is to let the muscles do the work that the cast is supposed to do, unless where immobilization is required for fixation.

This movement is applied to the lateral thoracic muscles to cause relaxation, especially in the rigid thorax of asthma. In this case apply the extension and flexion to the thorax as a whole: (a) With the patient sitting up, stand in front of him and grasp him around the thorax, fixing your fingers on either side of the spine (that is, on both sides) about the tenth dorsal vertebra. Make the patient breathe deeply and while doing so, press your chest against the anterior thorax of the patient, at the same time pulling up from your fixed point at the tenth dorsal and give lateral flexion from side to side. (b) With the patient lying down apply a similar treatment. In giving this treatment keep moving the fingers upward from the tenth dorsal to the seventh dorsal, as before, and pull upward diagonally, applying pressure on the chest at the same time.

This treatment is also applied in tumorous conditions of the axilla and lymph glands around the clavicle and mammary glands. The result of the treatment is to relieve the lymph circulation and cause absorption of substances in the floating tumor. If it is a fixed tumor you must first make it a floating one. To do this give the thoracic extension and flexion along with vibration and kneading around the base of the tumor- NOT OVER THE TUMOR.

This treatment is also applied to the hip joint in case of partial or complete dislocation. Grasp the limb with one hand at the ankle, the other hand on the femur and then give the treatment similar to that for the shoulder joint. In this case the patient is lying on the back or the side, if the right hip is dislocated the patient is on the left side and vice versa. In some cases this treatment is applied with the patient sitting, for example, when the hip joint is dislocated and then ankylosed to some portion of the pelvis, give this type of treatment to relax the ankylosed condition and after the ankylosis is reduced give the same treatment to reduce the dislocation.

This movement is also applied to the spine. With the patient on the back, have some one hold the feet of the patient in order to keep the body from moving. The operator is at the head of the patient, places his hands beneath the axilla of the patient, until the fingers meet at the spine; then the operator grasps the thorax tightly in his arms with the strongest traction on the spine that can be given and while giving extension give a slight swaying movement of the body from side to side and a slight rotatory movement, antero-laterally. This is referred to as spinal extension.

**FLEXION:** Flexion alone is applied principally to the moving joints, such as the hip, knee, ankle, wrist, elbow and shoulder, for the removal of stiffness, the stiffness being chiefly in the ligamentous structures.

It is also applied to the neck and to the upper part of the spine

down to the eighth dorsal; For example, spinal flexion is the only method that there is for reaching the articulating ligaments and the deep layers of the muscles along the upper dorsal region. In this case the best method of application is with the patient on the face, with a pillow under the chest, large enough to curve the upper dorsal region, and then apply flexion to the spine.

Methods of flexion: (a) Stand at the side of the patient and place one hand at the angles of the ribs on the same side on which you are standing; place the other hand at the sternal end of the ribs on the opposite side, pushing away from you with the first hand and pulling toward you with the second. (b) Stand at the head of the patient, patient on the face, put both hands around to the sternal ends of the ribs and give a swaying movement. (c) It may also be applied with the patient sitting. Flex the neck well forward and then manipulate the neck downward to cause relaxation, and in manipulating upward use one hand at the spine and place the other at the vertex, rotating the upper half of the body and the head in a semicircular movement; at the same time use the hand at the spine as a fixed point, moving upward and downward at least as far as the seventh cervical above and the eighth dorsal below. This is the strongest treatment that can be given to reach the spinal cord.

IX. THE TWISTING OR CONTORTING MOVEMENT: This treatment is given for the purpose of; (a) relaxing stiff or rigid soft tissues; (b) breaking up adhesions, particularly of some soft tissue to another; (c) to stimulate the fluid flow from one point to another point in the direction of the twisting movement; particularly in hyperaemia of the soft tissues; (d) it is applied also to the intestines to stimulate the peristaltic action in some cases to remove semi-fluid accumulations in the walls of the intestines and to relieve the accumulations of gases.

This treatment may be applied to the neck, but extension should be given previously in this case. Stand at the head of the patient, catch the head of the patient in your two hands so as to get a good grip of the head without holding the neck; then give extension up to the point of the weight of the body, and twist the neck, using the hands on the head as the force; twist the head around laterally as far as you can on both sides. If the tissues resist give a gentle shaking treatment at the same time as you twist and keep up the extension.

This treatment can also be applied to the arms and to the trunk of the body. Have the patient sitting in an upright posture, stand either in front or behind him, grasp the trunk of the body so that you can get hold of the entire trunk. The light the weight of the body sitting, and turn from side to side, e.g. in thoracic rigidity; in intercostal neuralgia; in diaphragmatic conditions; and in bound conditions of the lower ribs. Where the lower ribs are involved stand behind the patient, twist the body to the side opposite to the bound ribs and pull the patient's body backward while you are twisting. This treatment applied to enteroptosis and gastroptosis, and pelvic congestions. In the latter case pull the body backward in extension.

This movement is also applied to the intestines, flex the limbs on themselves and then on the abdomen; catch the colon at the two extreme points, that is, ilio-caecal and hepatic flexure, with one hand the intestine in fixation and with the other give a twisting movement.

X. ARTICULATION: This has been referred to before under the passive reflex movements. It also belongs under the passive treatments. It is applicable to any structure or organ in the body that has mobility in relation to another structure or organ. The purpose of the passive use of articulation is for reposition. For example, in correcting a vertebral lesion,

the most important means of replacing in a correct position is to move the vertebrae upon or in relation to articulating structures in order that by the use of the physical articulation the structural misplacement may be corrected. Articulation is possible as we found before in connection with the vertebrae, the ribs, the clavicles and all the structures of the four extremities. It is also applied to the organs in relation to one another and the attachments of the organs in the cavity fields. Articulation is based on two factors: (1) the mobility of all structures, and (2) the articular relation of structure to structure. No rules can be laid down as to technique, because the principles of flexion, extension and rotation are applied to the structures based on the physics of leverage and mobility. That movement is applied which gives the freest field within the range of the organ or structure involved.

XI. THE JERK, OR THRUST. This movement is of great value in the passive treatment. Like some of the other passive movements, it was used by the bonesetters. In Bohemia we find a system called "Napraviti". In 1903 I investigated this system. I found Vejooda, the great practicing Lipony Doctor, the grandson of the originator of the system called Napraviti. He has letters and records extending back about seventy-five years bearing direct testimony to the good work done by himself, his father and grandfather. Napraviti is a system of normal mechanics applied to the correction of spinal and other deformities. It is not limited to the spine. In correcting curvatures of the spine, the old Doctor stood to the side of the curvatures, thrusting from right to left, giving traction on the left shoulder towards the right side in direct opposition to the thrust. In treating the ribs the thrust was given directly antero median, producing a distinct cracking of the costo-vertebral articulation. In correcting the subluxated femur posterior, patient lies on the face, the leg is flexed until the heel is planted in the gluteal muscles. One hand is placed midway between the greater and lesser trochanters, and this enables us to give the thrust antero-median, while the other hand holds the foot at the arch. In case of an external femur rotation, patient lies on the back and the leg is flexed with the thigh flexed on the abdomen. The hand of the operator passes between the calf and the thigh and gives a rapid jerking inward rotation, the other hand holding solid the thigh in flexion. This technique corrected a hip dislocated for over eight years that had resisted four previous attempts at reduction.

In Bohemia Vejooda uses active exercise in conjunction with and as an essential part of the passive treatment. His favorite active exercise is to have the patient place the right elbow on the left knee, or vice versa, and give traction to the spine in this position, in case of a right lateral curvature strong traction from left shoulder to right knee and vice versa in the left lateral curvature. In the anterior and posterior curvatures this treatment is given with a rotation and twisting jerk of the head, neck and upper part of the back, down to the eighth dorsal.

In treating the neck I use a similar movement. Patient on the back. With one hand in the suboccipital region, I pull out the neck in extension; with the other hand I catch the corresponding transverse processes of the particular vertebra to be moved, and then twist the neck with a jerking thrust towards the side of the lateral rotation. Where great rigidity exists I push the head forward in strong extension on the chest, resting the back, or top, of the head on my chest; with one hand I grip the lateral side of the head and with the other hand the transverse process of the vertebra to be moved on the side opposite to the other hand, giving a rotatory twist with a jerking and thrusting movement, in rotating.

Applied to the ribs or vertebrae I thrust or jerk with the cushion part of the fingers or hand upward or downward, allowing the fingers to yield quickly when articulation is established, thus appealing to the elasticity of the tissues and the articulation of the contiguous structures.

I saw Bonesetter Jones in Wales, and Hugh Ferguson at Blantyre in Scotland, give practically similar treatments. The bonesetters call it the jerk instead of the thrust. Bonesetter Niorgen, in West Virginia, demonstrated for me his treatment of a subluxated hip, his method being that of flexion and rapid rotation with a thumb-push at the head of the head of the femur. His spinal treatment was always given with the leverage of the limbs elevated and a strong thumb-thrust at the point of subluxation.

What is the value of the jerk or thrust? It appeals to the rigid tension of the articulating structures, its suddenness arousing a quick reaction and the jerk representing more or less traction with an elastic reaction that tends to correct the slightest misplacement existing in these cases. Any one who has seen Dr. Still demonstrating knows that his movements are those of the lightning adept, and that the thrust and jerk is the continued accompaniment of his rotating, flexing or extending movements.

ACTIVE ACCELERATION AND INHIBITION

AS VITAL PHENOMENA.

There is one thing that we must guard against, namely the use of terms in an incorrect way. The nomenclature we use must be, if possible, scientifically accurate. Inhibition and desensitization are terms that have been used in connection with clinical therapeutics in Osteopathy. The question is, will scientific physiological considerations justify the use of them. Clinical therapeutics is of itself empirical, until subjected to experimental observation and research, according to scientific physiological principles. Undoubtedly the mechanical stimulation and inhibition of the nervous system is possible physiologically, the nature of the stimulation and inhibition determining what takes place. In the case of a sensory nerve the sensory impulse may be cut off by desensitization; in the case of a motor nerve the motor impulse may be cut off by inhibition; and in the case of both sensory and motor nerves stimulation mechanically may result in the acceleration of impulses physiologically. When mechanical desensitization, inhibition and stimulation take place, are these converted into physiological equivalents? If so, in the process of conversion and as a result of the transformation of the physical into the physiological, are we able to modify the vital phenomena, to increase or decrease the vital processes and to alter the functionings thereby? These are physiological questions that we must settle before we can claim any therapeutic value for Osteopathy.

The physiological significance of stimulation, inhibition and desensitization lies in the fact that impulses are sent out along a nerve path from certain centers, so that all manipulation mechanically affecting the nervous impulse really affects the centers from which the impulses originate, making the impulse either accelerator or inhibitory in its nature; while in desensitization the sensory impulses are cut off in their passage toward the center and are thus prevented from physiologically modifying the center of receptivity. It is not necessary to enter into the theory of neural activity. It is sufficient for our purpose to know that there is neural force, whether it passes by means of vibration or otherwise along the nerve path. The nerve center is the great generator and the fiber the conductor of the neural impulse.

In the osteopathic field stimulation and inhibition will thus have a double significance. (1) As a temporary expedient, by mechanical means, where temporary relief is demanded, for example, in the case of a weak or over-active heart. Dr. Abrams, in an article in the Philadelphia Medical Journal of Sept. 29, 1900, points out that heart inhibition may take place by means of the forceful contraction of the muscles of the neck. One important point of osteopathic significance indicated is that when the inhibitory action is wrongly executed, the action of the heart is increased. (2) As a distinct and definite mechanical means of stimulation and inhibition. In this case we have the physiological basis for dealing with those cases not associated with distinct or apparent lesions as their cause; or in cases where the lesion, if apparent, is secondary, when the pathological or abnormal condition of the organ or tissue primary in the functional reaction. In this case the stimulation or inhibition is primarily mechanical, the mechanical stimulation or inhibition of the nerve either directly or indirectly resulting in the physiological stimulation or inhibition of a cell center from which alone physiological stimulation or inhibition can take place.

The brain represents the great center of all the vital processes, the centers of co-ordination, as well as the center of origin for the tonic,

trophic, and nutritive influences of the nervous system. Manipulation of these brain centers directly is impossible. Hence the manipulation must take place through some nerve pathway of reflex activity, the mechanical stimulation or inhibition being converted into a physiological stimulation or inhibition in the fiber and transferred to the center of the cell. The same thing is true of the spinal cord and peripheral ganglionic centers. It is in this way that stimulation and inhibition from the cells or centers form the basis of a curative or palliative agency in dealing with diseases.

But is this condition of stimulation or inhibition something foreign and purely mechanical that is forced upon the nervous system and through it upon the organism? Our answer is, NO. Stimulation and inhibition are the fundamental factors of life in the tissues and cells and as such pervade the entire organism to such an extent that the continuity and rhythm of the various organs and tissues of the body depend upon these opposing phenomena of life. Life is built upon the principle of antagonism and antagonistic activities; "the struggle for existence" is the apt expression of the truth, that opposing processes and functionings make up the sum total of physiological existence. Any functional branch of physiology would illustrate this principle.

The human body may be regarded as made up of several tissues, each tissue having its own characteristic. At the same time the only tissues that are supplied completely with efferent nerve fibers are the striated and unstriated muscle tissues. The former, including the muscles of the trunk and limbs, receive efferent fibers from the cerebro-spinal system; the latter, including the alimentary and vascular muscles also receive efferent nerve fibers from or in connection with the cerebro-spinal system, either directly or through the sympathetic system. This leaves a considerable portion of the organism dependent upon its own inherent activity, the nervous system influencing these parts mainly through the adjacent tissues or the fluids found in or circulating through them. For example, in the submaxillary gland we find the reception of oxygen and the throwing off of carbon dioxide going on continuously, whether the secretion is continued or is retarded, so that the life process of the gland, distinguished from its individual functional activity, will go on irrespective of nerve impulses. If however, the nerve impulses are modified in connection with the amount of work done by the gland and therefore in connection with the amount of work done by the gland energy set free, we find there is a resultant effect on the secretion.

This is principally characteristic of those functions of the body associated with the involuntary as distinguished from the voluntary nervous system. The chief characteristic of this involuntary system is the fact, that these nerves, after passing out from the cerebro-spinal system, terminate in the nerve cells, these cells representing an intermediate station, from which nerve fibers pass to the unstriped muscle and glandular tissue, carrying impulses that have been undoubtedly modified and transformed in the intermediate nerve cells.

One of the fundamental characteristics of these involuntary nerve fibers is the presence of inhibitory nerve fibers which have the power to stop or check some activity in the unstriped muscle or glandular tissue. Some physiologists claim that all tissues, including striped and unstriped muscle and gland tissue, have these inhibitory fibers. Modern physiology, however, does not justify this view, because there is undoubtedly unstriped muscle and glandular tissue that does not exhibit any of the phenomena of inhibition. This is primarily dependent on and explained by the fact that

such a specific nerve energy is not required, as inhibition can be secured without inhibitory fibers, simply by the modification of the impulses passing down along the regular motor nerve paths. Inhibition, however, is a fact, whether there are specific fibers or not.

The correct theory of body activity, both local and general, involves a free response of the part of the cerebro-spinal system to the impressions made upon the peripheral parts of the body, both external and internal. In the peripheral ganglia there is no evidence of the separate ganglia being connected with one another so as to present a completely connected peripheral ganglionic scheme of co-ordination. Hence, according to Langley, there are not found in the sympathetic system, "special sensory nerve cells with peripheral sensory nerve endings," all the nerve cells being essentially motor cells. The complexity of ganglia, therefore, peripherally consists of duplicated cells of a single type, "the motor," the spinal cord cell branching out in connection with single cells, these cells sending out branching fibers that terminate in unstriped or glandular tissue cells. We must not forget, however, that possibly in the development of the sympathetic system some nerve cell connections have been established on the same basis of analogy as the nerve cells of the brain and have established wide connections with many parts of the organism. To this class must be referred the nerve cells in the alimentary canal and the Meissner and Auerbach cells.

The difference of this cell attachment is evident from the regeneration process in the peripheral as compared with the central nervous system. When a peripheral nerve is divided, regeneration takes place, the central part from the spinal cord regenerating along its old medium of development into the muscle or other tissue. This applies both to the preganglionic part between the spinal cord and the peripheral ganglia and to the post-ganglionic part from the peripheral ganglia to the terminus. If the nerve fibers in the spinal cord degenerate, they will not regenerate, chiefly because in this case regeneration would imply re-establishment of terminal connection with the nerve cells, and this seems to be physiologically impossible in the central nervous system, although it is possible in the peripheral ganglionic cells. This indicates the difference in the functional activity of the central as compared with the peripheral nervous cells. Thus the latter are centers of distribution and transformation of neural activity.

Gould defines stimulation, as, "(1) quickening or increasing some trophic or functional process; (2) an agent exciting the functions of an organ or some process of the economy." Inhibition is "the act of checking, restraining or suppressing, any influence that controls, retards or restrains." Physiologists have demonstrated that nerves can be stimulated and inhibited mechanically. This can be converted into physiological stimulation and inhibition, with the result that the trophic influence may be modified and the functional activities altered.

Some have claimed that osteopathic therapeutics is limited entirely or almost entirely to correction of misplaced tissues and does not include stimulating or inhibiting treatment. This we consider to be but a partial view of the osteopathic field. Osseous lesions do not represent by any means the full osteopathic field and in many cases osseous lesions are secondary to some other lesion. Muscular lesions figure as largely in the field of lesion as the osseous. Besides, stimulation or inhibition may be frequently an absolute prerequisite to correction of osseous misplacements, being preparatory to corrective measures. Hyperaesthetic cases frequently demand inhibitory treatment to quiet the patient and soothe the tissues. The writer treated two cases in Europe, one of toothache which had persisted for

a long time, and another of persistent local inflammation; in neither case could any misplacement be detected. The stimulant and inhibitory methods were followed and in neither case has there been a return of the condition, although several months have elapsed since the treatment.

We must remember that stimulation and inhibition are physiological phenomena and that these can be effectively modified mechanically, when they become pathological. Of course, we must carefully distinguish the one from the other, and yet we must not draw any fast line of distinction. Excessive stimulation produces an inhibitory effect. Hence the inhibitory method of dealing with a condition seems to be of greater therapeutic value. In stimulating there must be a series of stimuli through movements or vibrations; and this frequently has an inhibitory result. This is in line with the physiological theory, that inhibition represents a check placed by nature upon certain forces, processes, functions in order to economize the forces of the organism and preserve normal functionality. Along this line we find Foster saying, "it is probable, though not actually proved in every case, that wherever in any tissue, energy is being set free, nervous impulses brought to bear on the tissue may affect the rate or amount of the energy set free in two different ways; on the one hand they may increase or quicken the setting free of energy, and on the other hand they may slacken or hinder the setting free of energy." (Text Book of Physiology, page 148).

Inhibition represents the restraint upon nerve force or upon the activity of stimulation supplied in another direction. This is of the nature of rhythm and for this reason is often of value in painful conditions, in rapid peristalsis, in cardiac excitement, and in hyper-vaso-tonicity. It has been demonstrated, for example, that if during the inhibition of the heart, mechanical stimulation be applied, the heart will beat, indicating that while inhibition takes place in the case of "the spontaneous beats," there is not an abolition of cardiac irritability. In other words it is a checking, restraining action, not an abolition or destruction of activity.

We must not forget that reflex action and reaction represent two potent agencies at the call of mechanical stimulation and inhibition, so that the great centers of nerve force can be reached; in addition to the pathological impulses or reactions of degeneration must be overcome in many cases before any normal nerve impulses can take their place and this can be done best by checking or restraining influence. Mechanical stimulation or inhibition in this case does not take the place of the physiological or overbear the physiological, but simply assists in the restoration of the physiological. This is done every time contracted muscles are relaxed and when osseous lesions are corrected, the effect in both cases being to substitute for the pathological impulse the physiological. If there is anything in Osteopathy it means that when a lesion is corrected, if such is found, there is the natural flow of neural impulses with all its consequential effects to the part that was deprived of these.

In very many cases, too, where the nervous system is affected, we find that meningeal thickening or semi-sclerosed nerve substance must be built up on a nutritive basis. The restoration of integrity frequently means the transmission of impulses stimulated by mechanical treatment so as to promote conductivity. A nerve cut off from its trophic center by compression undergoes fatty degeneration and gives the reaction of degeneration. Under this compression it is found that "voluntary impulses or stimuli applied above the compressed spot give rise to impulses which are conducted through the nerve, and in the case of a motor nerve, cause contraction of the muscles, whilst the excitability of the parts below the injured spot is greatly diminished." (Landois). This while excitability may be lost in an



injured nerve the power of conductivity will be preserved, if neural continuity persists, and this forms the basis of the application of stimulation to keep up conductivity and assist in the regenerative process. This is the basis of vibration applied curatively in paralytic cases.

Stimulation refers to the production or increase of functional activity. In healthy conditions the organs and tissues act and react upon one another, the nervous system forming the medium of the physiological stimulation; as a result all the organs are functioned in sympathy and unison, If the organism is strained, this strain will react as a stimulus upon all the parts of the organism. Hence the entire system is in a condition of tonicity, the skeletal muscles, the visceral muscles, the arterial muscles, the parenchyma of each organ are in harmony under the influence of a continuous stream of impulses originating in functional activity and in the environmental stimuli. Thus the vibrability of air, light, heat, sound, etc., in connection with the skin and the special organs of sense and respiration, the hydrostatic and hydrodynamic influences of the fluids of the body, keep up that continued stimulation which is essential to perfect activity. If any of these vary from the normal, restorative means lie within the grasp of the operator in mechanical stimulation and inhibition. A moving pressure, light-applied over a nerve produces stimulation; while a constant pressure, lightly applied at first and increased steadily, by checking the passage of impulses acts as an inhibition. or the moving pressure applied to a nerve, whose function determined from its center connection is inhibitory, may produce the inhibition of an organ.

The latent energy of the organism may be aroused by means of stimulation so that the body functions may be put upon the defensive, especially in resisting the inroads of disease and of those germs which act as exciting causes of disease. In this way germs may be kept out of the organism, or they may be prevented from ravaging the tissues, by making the tissues resistant.

In the body obstruction of nerve impulses acts upon the organ supplied with innervation as an inhibitor, or it may act as a stimulant by cutting off inhibitory impulses that are normal. It is in this way that muscular contracture, osseous lesions, etc., act either as stimuli or inhibitors of functional activity. In addition, the nerve centers, which determine the functioning, may be stimulated by treating the nerve pathways to or from the center; or by stimulating the peripheral terminals of the sensory nerves, we may act upon the muscle tissue. And even when the muscle is in a contracted condition the direct manipulation of the muscle affected will result in relaxation; that this may be done independently of the nervous system is demonstrated in cases of muscular anaesthesia.

It is necessary to remember that over-stimulation amounts to inhibition, throwing the organs into an atonic state. It is this that furnishes the basis of organic lethargy and inactivity when the spinous muscles are in a condition of profound contracture. The removal of this contracture and replacing it by muscular relaxation will restore to the normal the organs function. Hence in the visceral areas of the spine contradictory (seeming) results are obtained upon the visceral organs by inhibition and stimulation. The primary effect is muscular relaxation and the free nerve functioning that follows will remove the anemic or hyperemic condition of the organ involved. In the cervical and sacral regions this seeming contradictory result gives place to a direct effect gained through the sympathetic, pneumogastric or sacral nerves, the latter functioning the visceral organs directly without passing through the lateral ganglia.

Here we have a double therapeutic effect in connection with stimulation and inhibition, (1) as a direct agency, mechanical, in producing the

physiological stimulation and inhibition, of a nerve or nerves, of a center or centers, and of correlated and co-ordinated organs or tissues; (2) indirectly, stimulation and inhibition lie at the basis of all corrective work of the Osteopath. By correcting a lesion, obstruction is removed or pressure is taken off, so that a free flow of blood, lymph, etc., and the free passage of nerve impulses increases the tendency towards the normal, that is always found in the body as a physiological condition of vitality, until the normal is restored. Mechanical correction, therefore, involves the conversion of the mechanical work done into a physiological effect of stimulation or inhibition, in connection with the neural vital force.

We have pointed out, that of the two, stimulation and inhibition, as physiological factors of life, inhibition is the more important and primary, because it represents counteraction, reaction, restraint in relation to vitality. The same thing is true from a pathological standpoint. One of the most important conditions we have to deal with is contractures of spinous muscles. This contracture is present either when osseous lesions are found or when no osseous lesions exist. By this contracture the spinal muscles are deprived of their normal blood supply, hence anaemic; the result of this is to throw the spinal blood supply into a condition of hyperaemia, the hyperaemia acting as an over-stimulation with an inhibitory effect upon the nerves. This involves the fact that the blood supply to the cord and the spinal muscles is collateral, so that with an over-supply to the spine there is an under-supply to the spinous muscles and vice versa. In correcting the condition of spinal contracture we stimulate to equalize the blood supply; and in equalizing it we allow nature to function on the normal basis, so that whether we have hyperaemia or anaemia of the spinal cord, the correction of the muscular abnormality involves the normalizing of the nerve force. In either case the hyperaemic or anaemic blood condition will involve vaso-motor changes, as we know that both hydrostatic and hydrodynamic pressure in connection with the blood supply produces changes, the hydrodynamic pressure especially effecting vaso-motor action.

Dr. J. H. Musser says, "anaemia is a stimulant to the vaso-motor center in the medulla and produces the contraction of peripheral arteries and high tension." In this way the mechanical action of contracture will act both directly and indirectly, through the blood and vaso-motor mechanism, as well as through the nerve supply to the muscles involved. The same principle is involved in tenderness, a hypertonic contraction of the muscles pressing upon the nerves and by overstimulation producing pain, which means an inhibition or shutting in of sensory nerve impulses that should be widely distributed. Thus we have primarily a blood effect, and secondarily a profound vaso-motor effect and a general sympathetic condition. Having vaso-constrictor and vaso-dilator centers the anaemic or hyperaemic condition of the centers in the spine might result in the equalizing of collateral blood supply, in the removal of the pathological inhibition, and especially in restoring the normal hydrostatic (volume) pressure and hydrodynamic (flow) pressure of the blood.

In line with this, we find in the American Text Book of Physiology, Dr. Donaldson writes, "the flow through the central system is subject to the influence of gravity (weight and volume) and takes place the more readily the more the resistance is diminished."

Inhibition from this standpoint, will represent both physiologically and pathologically, the more important factor, because more potent in life and more potent in disease. Probably stimulation may be regarded as representing the inherent activity possessed by all bioplasmic tissue structures, while inhibition "developed in the central nervous system, is

not produced by a special set of nerve fibers, but is the result of the action of several incoming impulses, arriving by different paths, on the responsiveness of a given cell." Inhibitory action seems to be regulative, the distribution taking place from the central nervous system. Hence if the accelerator and inhibitory nerves to the heart are stimulated simultaneously, inhibition will prevail; as a matter of fact the tonic condition of all parts of the body involves the presence and activity of these inhibitory impulses and in emergency conditions the great relief furnished to an over-taxed organ or organism is furnished by means of inhibition.

Osteopathic work is not then simply corrective or clearing the pathway for nature's tendency to the normal to assert itself. Stimulation and inhibition are vital phenomena and they can be used therapeutically. If the correction of lesions, whether osseous or muscular, represents all or a great part of the work, then the idea of lesion brings us down to a mechanical and material conception of disease. Life is not materialistic. The anatomical basis of the organism is undoubtedly mechanical, but the mechanical principles of articulation, tissue vitality, etc. are essentially vital and this must not be overlooked. The body is subject to mechanical lesions, but it is also subject to vital lesions, and any in-coordination of the physiological produces anatomical disorder.

Inhibition in this connection, represents that check that is put upon some hyper-activity or hyperaesthetic condition found somewhere in the body. Sometimes it prepares for the correction of the lesion, sometimes it corrects the lesion, and sometimes it simply checks pain or releases contraction. In osteopathic therapeutics inhibition would be classified as an anesthetic. For example, inhibition can check vomiting, by establishing an equilibrium in the stomach which reflexly affects any organ that may be arousing the vomiting reflex. It can check diarrhoea by restoring the normal peristaltic functioning to the intestines and this functional condition reacts upon the irritating cause of diarrhoea. Inhibition can lessen pain and ~~release muscular contraction~~ release muscular contraction, perhaps by establishing influences that react directly upon the cause of these conditions. We must not overlook the fact that in the organism there is a vast array of nerve reflexes and reactions and that the tendency to the normal represents a vital power that tends to bring everything into co-ordination for the purposes of life. Inhibition frequently gives this power a chance to assert itself. In thoracic disease conditions we know that one of the greatest checks upon normal movement is pain. And this may be true of the entire body. Pain throws the body or a part of it into a resistant attitude, because movement aggravates the pain. Thus the pain keeps up an inhibitory check upon the normal movements. According to Hilton this would indicate rest. But rest in the sense of cessation of movement would mean loss of functioning and death. How then can we deal with it? By inhibition which will remove or check the pain, thus preparing for that movement which is essential to thoracic functioning. It has been clearly demonstrated that the skin and the air vesicles of the lung, the skin and the myocardium of the heart, the skin and the muscles of the abdomen, are all innervated in connection with the same reflex nerve supply from the spinal cord. Therefore inhibition at the segmental point indicated will act as an anaesthetic locally.

This is in line with (and really carries out) the important physiological law of Head. "When a painful stimulus is applied to a part of low sensibility in close central connection with a part of much greater sensibility the pain produced is felt in the part of higher sensibility, rather than in the part of lower sensibility to which the stimulus is applied."

This applies to all forms of nerve impulse, stimulation, in which sensory, motor and vaso-motor effects are produced, and inhibition. The visceral organs represent the lower sensibility, the cutaneous and muscle tissues in the spinal areas the higher, so that pressure applied cutaneously has a transferred effect deeply, as well as a local effect in lessening hyperaesthesia. How? The impulses that pass to the center are checked, the physical, chemical and vital changes of the center are lessened and this prevents the passage out of abnormal impulses to the viscus.

Thus the response to this local inhibition is in reality three-fold, (a) a relaxation of the superficial (voluntary) muscles, (b) a relaxation of the deep (involuntary) muscles of a viscus centrally connected and (c) cutting off those sensory impulses of an abnormal kind that are registering in the sensorium. Thus inhibition calls into activity the cerebro spinal nervous system, the sympathetic nervous system, and the cerebral (central, brain communicating) nervous system. In this way the storm center is calmed, brain impulses that are antagonistic to normal vitalities are checked and the visceral condition is so modified that normal functioning is possible, the co-ordination of nerve, blood and muscle forces being secured. This makes inhibition an active palliative and curative agency.

The results of inhibitory treatment have been demonstrated in connection with the discovery of the nerve centers and fibers controlling the different organs. For example, the inhibition of the vagus tends to palliate cough by relieving the irritation to cough arising from bronchitis bronchial catarrh, etc. Inhibition of the sacral tends to relieve pain in the rectum and bladder and also to palliate the pelvic inflammations. In intestinal colic there is muscular overaction in the intestines resulting in muscular overcontraction, retention of food and resultant gas formation. To relax these muscular contractures, representing spasms of contraction in the intestinal muscles, to free the blood circulation so as to aid in digestion of the food, and to stir up peristalsis to remove the accumulated mass, inhibition applied in the lower splanchnic field and the upper lumbar area tends to gain control of the stomach and intestines, relieving the pain and stimulating normal action.

In the pains of ovarian and uterine tumors, inhibition in the lower dorsal, lumbar and sacral regions, especially at the 11th and 12th dorsal will relieve the pain.

Neuralgic pain of the face and head may be palliated by inhibition in the superior cervical ganglia field and over the fifth cranial nerves, and at the fifth cervical, tending to relieve the pain, tired feeling, nausea and exhaustion.

In a case of typhoid fever we found a persistent headache with a hysterical delirium. The back of the head and spine were hot, patient said at times burning, causing a steady, dull ache, producing fainting several times. Before the faint patient said the pain settled as an overfulness over the forehead, then swimming of the eyes and head and unconsciousness. Treatment used to palliate was inhibition (1) over the superior cervical ganglia; (2) at the 6th, 7th and 8th dorsal where the muscles were corded and hard, sensitive and painful; (3) at the fifth lumbar where heat and sensitiveness were complained of. The net result was to relieve the irritation, equalize the blood circulation and relieve both headache and fainting. For a few minutes after these were relieved, the entire surface of the body seemed hyperaemic—almost purple in color—and felt warm with a glow of heat and the patient rolled the head back and forth from a sense of relief. In the same patient the febrile temperature of 101 or 102 degrees would be relieved quickly by inhibition (1) in the suboccipital

region, (2) in the lower cervical region along the transverse processes anterior, and (3) in the splanchnic region. The net result in this case was (1) the stimulation of sweat, manifested by the moisture all over the surface of the body, and (2) the relaxing of the abdominal blood vessels and the filling of these with blood, manifested by a warmth in the intestinal field very noticeable to the patient.

In a case of delirium, the result of slugging that caused a very marked anterior movement of the occiput with the posterior prominence of the atlas and rigidity of the muscles in the neck, persistent inhibition was applied at the superior cervical region and in the subocciput with extension of the head and neck. At first on account of sleeplessness the inhibition had to be kept up for over an hour at a time. It never failed to produce sleep and the sleep continued for several hours. Each sleep period relieved the delirium partially until after two or three weeks the mental unbalance was overcome. At times it would return with warmth inside the head and the dragging of the head backward. Inhibition, as before, always relieved the condition. Patient is now well.

These, and similar cases, have lead us to the conclusion that as inhibition is a vital phenomenon, mechanical inhibition may be used with palliative and curative effects. We must explain why?

#### INHIBITION AS A VITAL PHENOMENON.

Inhibition as a physiological factor lies at the basis of life and forms an important element of every vital phenomenon, such as sensation, motion, secretion. Life consists of a struggle for existence and no struggle can be sustained unless on the basis of dualistic elements. All vital phenomena are associated with antagonistic activities, as there is no vitality in the entire absence of activity. So far as the nervous system is concerned this struggle for existence is sustained by the impulses of activity which are of a two-fold nature, those of active stimulation and of inhibition. The basal condition of neural life is found in the fact that both of these are necessary for the vitality of the local parts and of the organism as a whole. Inhibition being the more important we will try to explain how it may be applied to the different vital functions or processes of the body organism as a fundamental physiological principle.

Inhibition is "the act of checking, restraining or suppressing; any influence that controls, retards or restrains." It involves the lessening or destroying or suspending of a vital activity from the positive side, under the influence of some form of stimulation. Its importance has hardly yet been fully appreciated in the biological, physiological and osteopathic fields. It undoubtedly represents physiologically a very important vital characteristic of the organism and its parts. According to Lauder Brunton, stimulation and inhibition represent different phases of excitement, the two relative conditions depending (1) on the pathway of the impulse, and (2) the rapidity of transmission. But this, like the Bernard theory of wave interference, is purely physical and takes no account of functional center activity which is at the foundation of the biology of the nervous system.

HISTORY OF INHIBITION. About sixty years ago Volkmann found, in experimenting with the vagus nerve, that by stimulation of the peripheral portion of the vagus in the frog the heart ceased beating for over a minute and after resuming its beat that the heart manifested an increased pulsation, the increase representing about thirty per cent per minute. He set aside the phenomenon, however, as due to an error in experimentation. It was not

until the time of Ernst and Eduard Weber, 1845-6, that inhibition was recognized as a new definite characteristic of neural activity and was designated inhibition. The explanation of this phenomenon was based on the alleged fact that the pneumogastric nerve became exhausted, when artificially stimulated, the heart stopping in diastole, the cavities of the heart being re-filled during the arrest. The inhibitory power was localized in the medulla, the inhibitory function being exerted through the vagus. In 1849 Schiff attempted to explain the phenomenon by fatigue, hypersensitiveness in the case of over stimulation due to any artificial stimulus producing the inhibition. In 1858 he applied the same principle to explain the inhibitory action of the splanchnic over intestinal peristalsis.

In 1868 Goltz suggested as a theory explanatory of the inhibitory phenomenon manifested from the external nervous system, the exhaustion of the center as a result of artificial stimulation conveyed to the center. Czermak in 1868 found that pressure upon the carotid at the anterior edge of the sternomastoid resulted in lessening heart activity, the lessened activity being due, as he thought, to vagus irritation. In 1869 William Rutherford pointed out that the inhibitory action is not constant, "a state of activity seems to be the exception." In 1877 Rosenbach applied the principle of vaso-constriction as an explanation of respiratory inhibition through the circulation in the medulla. The constriction was supposed to affect the medulla blood vessels, as it had been claimed by Brown-Sequard in 1854 that vaso-constriction in connection with the coronary blood vessels explained the diastolic stoppage of the heart. Mayer has used the same principle of vaso-constriction to explain the inhibition of intestinal peristalsis through the splanchnics. Waller more recently attempted to explain away inhibition by characterizing the inhibition as apparent rather than real, the apparent inhibition arising from the contractility of the opposing muscles.

These attempts to explain away inhibition have only emphasized the importance of it as one of the principal vital phenomena in the organism. As we survey the field we shall find that it pervades the entire organic life and has a fundamental bearing upon every manifestation of vitality in the functionings of the body. Stefani in 1880 advanced the theory that the explanation of inhibition is to be found in connection with trophicity and Gaskell is the most ardent supporter of this idea, that in the heart under the vagus influence we get dissimilation during systole and assimilation during diastole. Gaskell claims in support of this that the after effect of inhibition is stimulation and the after effect of stimulation is inhibition. This reduces stimulation and inhibition to the plane of nutrition and bases all nerve activity upon nutritive conditions, a principle that is of great importance in the osteopathic field, because nutrition and proper nutritive conditions form the basis of life and health. The nutritive conditions are represented by the blood and nerve force, so that if stimulation and inhibition are inseparably associated with these, this forms another reason for regarding them as fundamental to vitality. This makes it of great importance in osteopathic treatment.

#### I. Inhibition in connection with circulation.

The first discovery of inhibition was made in connection with the stimulation of the peripheral end of the pneumogastric. If the stimulation is medium in strength the cardiac tonicity is lessened, the cardiac cycle is modified to the extent of diminishing the systole and increasing the diastole; if the stimulation becomes very strong, the heart ceases to beat in diastole. This forms the basis of the theory that the pneumogastric conveys cardio-inhibitory impulses from the cardio-inhibitory center in the medulla to the heart substance, resulting in cardiac tonicity in connection with

the play of opposing influences, active stimulation from the sympathetics and inhibition from the cerebro-spinal system through the vagus. That these are subject to reflex stimulation has been shown by Coltz in his experiment of tapping the abdomen of a frog with his scalpel, resulting in the heart standstill in diastole. After resting for a short time the heart begins to beat more quickly than normal. According to Sezold the accelerator fibers pass from the spinal cord by the roots of the second dorsal nerves to the inferior cervical ganglion, coming from the annulus between the inferior cervical ganglion and the first dorsal ganglion, joining the vagus trunk, at least in the frog. By stimulating in the region of the last cervical and first dorsal ganglia the heart action is augmented, although this accelerator action is found, in the frog at least, only after the stimulation is removed, because the inhibitory effect is more readily secured, acceleration being secured only as a delayed and persistent after effect. If the inhibitory and accelerator nerves are stimulated simultaneously, inhibition prevails, probably because it represents both the tonic and trophic impulses to the heart.

In connection with the blood vessels we find both vaso-constrictor and vaso-dilator fibers. If both are found, as they generally are, in the same nerve trunk, the constrictor influence is more powerful, because it represents constant inhibitory activity in connection with tonicity, as distinguished from the emergency action of the dilators. Where the vaso-dilators alone are found in the nerve trunk, as in some of the cranial nerves, for example, the chorda tympani which represents the dilators to the sub-maxillary gland, the opposing action of constriction is found in connection with the sympathetics-viscero-motor. Here we find the reversal of inhibition and stimulation, but the dilatation in this case is really an inhibition of the arterial constriction; hence the dilators are inhibitors of the arterial wall constriction. In the case of the depressor nerve we have an inhibitory nerve which inhibits, afferently, the vaso-motor center, with the effect of inhibiting, efferently, the vaso-constriction of the peripheral arteries, diminishing the blood pressure and promoting the blood flow away from an overcharged heart.

In the splenic circulation we find rhythmic contractions and expansions corresponding with the variations in the blood pressure. This is of special importance when we remember that the spleen alone among the organs of the body possesses a local arrangement for the keeping up of its circulation, so that it is independent of general arterial pressure to a certain degree. By the stimulation of the peripheral ends of the splanchnics the spleen contracts and even after the division of the vagi and splanchnics, the rhythmic contractions persist. In addition to this, the stimulation of the splanchnics may produce an inhibition of the rhythmic contractions, indicating the presence of the splanchnics of inhibitory as well as accelerator fibers, the splenic rhythm arising probably from the periodic antagonistic action of these two kinds of fibers in connection with the blood flow. In the splanchnics there have also been found dilators to the thoracic duct and the receptaculum chyli; these dilators being inhibitory in their function in connection with the lymphatic flow. In the dog these are efferent fibers, the stimulation of which results in dilation of the receptaculum chyli. Thus we find in connection with the heart, the blood vessels and the lymph circulation, the inhibitory function at the basis of the circulation of the fluids of the body.

## II. Inhibition in connection with respiration.

The superior laryngeal nerve represents a sensory branch of the vagus, supplying the mucous membrane of the larynx with sensation. By the excitation of this nerve there is produced (a) an inhibition of inspiration, and

(b) an excitation of expiration in connection ~~with the center~~ with the center. Hence the weak stimulation of the superior laryngeal inhibits the inspiration, the pause being lengthened; but if the stimulation becomes ~~in~~ very strong the respiration is arrested in expiration with a tetanic condition of the expiratory muscles. The glosso-pharyngeal acts as an inhibitory nerve of respiration in connection with the deglutition process. The inhibition in this case is preceded by a stimulation, the stimulating taking place through the sensory nerves to the tongue and the pharynx, the sensory stimulation passing to the center being radiated from the deglutition center, causing a short inspiration followed by inhibition through the glosso-pharyngeal.

Similarly the central stimulation of the superior maxillary division of the fifth nerve produces an inhibition of inspiration. When the lungs become abnormally ~~inflated~~ respiration is suspended in the inspiratory phase the muscles becoming relaxed, indicating the effect of an inhibition. If the vagus nerve is divided and stimulated centrally with a very strong stimulation, the respiration is arrested in expiration, indicating that inhibition takes place through the effect upon the center, resulting in the relaxing of the inspiratory muscles. In the case of the trigeminal strong stimulation from irritant gases or poisons may arrest the respiration in expiration. The strong peripheral stimulation of the splanchnics may produce a stoppage of respiration by the inhibition of the inspiratory muscles.

Hence we may conclude that inhibition represents a normal reflex in connection with the play of inspiration and expiration in the respiratory mechanism. The vagus, for example, contains both inspiratory and expiratory fibers, the respiratory rhythm depending upon the afferent impulses that are carried by the vagi nerves to the respiratory center, resulting in the discharge of energy of different kinds to the muscles of inspiration and expiration. The opposite results that are gained by the weak and strong stimulation of the vagi nerves after division are due to the two kinds of fibers, the one accelerating and the other inhibiting, the two kinds of fibers having different functions to discharge and in the discharge of these opposite functions, maintaining the rhythm of respiration. Respiration furnishes one of the best examples of this double example. The pneumogastric trunk contains two kinds of afferent fibers in connection with the respiratory center, the one accelerating and the other inhibiting center activity. And as respiration consists of inspiration and expiration those afferent impulses that reach the medulla accelerate or inhibit the one and at the same time inhibit or accelerate the other through center action. Thus respiration furnishes an example of double antagonistic action in connection with the afferent impulses in the vagus trunk. The mechanical expansion of the lung alveoli stimulates the fiber terminals in the lung, the impulses thus generated inhibiting inspiration and accelerating expiration simultaneously, while mechanical relaxation of the lung alveoli stimulates the terminal fibers that inhibit ~~expiration~~ and accelerate inspiration. Thus it will be noticed the primary factor is inhibition. The same thing is true of other afferent respiratory influences.

### III. Inhibition in relation to alimentation.

Inhibition and inhibitory phenomena are found to be at the basis of all the alimentary movements. In connection with the oesophagus as the deglutition process begins and in its progressive stages it is found that each deglutition movement is preceded by an inhibition, the contractions taking place in the upper, middle and lower parts of the oesophagus at periodic successions of time. If this normal interval of time is abnormally lessened so that these separate swallowing processes follow closely upon one another,



these swallowing processes with their movements become grouped into series, each series of short deglutitions representing a single deglutition, the contraction in the middle and lower parts of the oesophagus being found only after the series. This indicates that each deglutition produces inhibition of the middle and lower oesophageal regions, this inhibition being determined by the deglutition center in the medulla, the glosso-pharyngeal branches acting as the afferent and the vagi as the efferent sides of the reflex. This is a definite and incontrovertible demonstration of the existence of normal inhibition as a constituent factor in the normal peristaltic functionality of the oesophageal processes and clearly indicates that inhibition is the essential factor in the functioning of this part of the alimentary mechanism. The inhibition in this case like acceleration is direct from the central nervous system.

In connection with the cardiac portion of the stomach, as deglutition begins, the tonicity of this cardiac portion becomes inhibited, that is, the muscle is relaxed. As the inhibition becomes complete, the tonicity is entirely suspended, and this takes place if deglutition becomes rapid and successive. Even after the division of the oesophagus, this inhibiting relaxation takes place, but the relaxation is destroyed if the vagi are divided, indicating that the inhibitory effect is produced by the vagi nerves, whose branches pass to the cardiac part of the stomach. The vagus nerves to the stomach are generally spoken of as motor fibers. In reality, however, they are accelerator nerves, for when peristalsis becomes excessive the stimulation of the splanchnics will arrest the peristalsis. The splanchnics here are the greater and lesser passing from the dorsal spine (sixth dorsal down) through the sympathetics to the abdominal plexuses and the walls of the abdomen. Thus in the stomach the alimentary movements are spontaneous but may be accelerated or inhibited by impulses from the central nervous system.

In connection with the pylorus it has been found that by stimulating the peripheral part of the splanchnic nerve, the pylorus becomes relaxed when it is contracted and the stomach is entirely inhibited; while the stimulation of the vagus produces contraction of the pylorus when it is relaxed and renews the stomach peristalsis. Volkmann pointed out in 1841 that by destroying the medulla or dividing the vagi the peristalsis of the stomach is accelerated, or, if the stomach has been resting, peristalsis is renewed, indicating that the vagi are or contain inhibitory fibers to the stomach. Hence the vagus trunk contains inhibitory as well as accelerator nerves, to the stomach. That the inhibitory function is of importance is indicated by the fact that by dividing one vagus and stimulating centrally the divided end the other vagus left intact will give an inhibitory effect upon the stomach. Dr. Meltzer reports the results of experiments upon dogs. By stimulating the peripheral end of the vagus by an induced electric current, there is a long period of latency, followed by pyloric contractions, these continuing after the interruption of the current. While these contractions continue a new stimulation of the vagus diminishes or destroys these contractions during a period of latency followed by increased contractions. This indicates that prior to the accelerator effect, there is an inhibitory effect upon already existing movements, so as to give full scope and force to the newly generated movements, inhibition preceding and preparing the way for accelerated movement. Inhibition becomes the basis in this way of accelerated motivity and also of successive increases in the motivity.

By stimulating the peripheral end of the splanchnic nerve from the spinal cord, or by dividing the splanchnic and stimulating the peripheral end, the peristalsis of the small intestine is arrested. This effect was supposed by Bazoh to be due to the lessened blood supply, resulting from the

vaso-constrictor action upon the minute arteries of the intestines. But it has been demonstrated that the effect is a real inhibition. This inhibitory effect has been found to consist of relaxation (inhibition) of the circular fibers and contraction (stimulation) of the longitudinal muscle fibers, the former representing the real inhibitory splanchnic fibers which are brought out by artificial stimulation, the splanchnics in reality containing both inhibitory and accelerator fibers. In connection with the vagus it is found that the stimulation of the peripheral end produces contraction of the circular fibers and relaxation of the longitudinal muscle fibers in the small intestines, indicating that the splanchnics and vagi have opposite functions in relation to the two kinds of muscle fibers, the circular and longitudinal, both containing inhibitory fibers. This gives the phenomenon of antagonistic innervation to the two muscular coats in virtue of which the primary effect resulting from vagus stimulation is inhibition of intestinal peristalsis, followed by acceleration when the stimulus is withdrawn, indicating that the inhibitory effect is preparatory to the accelerator, as well as more easily produced, while the accelerator effect is more persistent.

In the case of the large intestine the abdominal sympathetic from the splanchnics through the mesenteric ganglion furnish the inhibitory fibers to the large intestine. The sigmoid flexure and rectum are controlled, (a) by nerves passing from the cord through the ganglia corresponding with the 11th and 12th dorsal, 1st and 2nd lumbar, by way of the inferior mesenteric ganglia, the hypogastric nerves and hypogastric plexus to the circular fibers of the rectum, (b) by nerves passing from the second and third sacral nerve area, by the way of the hypogastric plexus to the longitudinal fibers of the rectum. Here, as in the oesophagus, the movements are carried on directly under the central nervous system. In line with this, Foster says, "this is the part of intestinal movement which fails in diseases of the central nervous system; the failure leading to obstinate constipation, if not to actual difficulty of defaecation." By the stimulation of the hypogastric nerves there is contraction of the circular and relaxation (inhibition) of the longitudinal muscle fibers, while the stimulation of the nervi erigentes (2nd and 3rd sacral nerves) produces the opposite effects, indicating the counter opposing action of the two sets of nerves at the basis of rectal peristalsis. Thus in the same sets of nerves we find the same dual action, contraction of the circular and relaxation of the longitudinal muscles, by the hypogastric nerves and vice versa by sacral nerves. This position is ably defended by Gaskell.

Inhibition and stimulation represent the two physiological phenomena, therefore, associated with all peristaltic activity in the entire alimentary canal, inhibition being preparatory, as we have seen, to every active increase of motivity. Therefore inhibition is the basic factor in peristalsis. We have seen that inhibition is one of the vital phenomena, basic in the struggle for existence of the entire organism. We also found that it lies at the foundation of the vital processes of circulation, respiration and alimentation.

#### IV. Inhibition in connection with secretion.

Secretion as a function depends physiologically upon circulation and motivity, especially vaso-activity. Hence it is difficult to distinguish the inhibitory function of secretion from the more general functions. Vaso-dilator action is essentially inhibitory. It has been found that the vagi and splanchnics furnish secretory and inhibitory fibers in connection with the secretory functions of the pancreas. If the pancreas is active secretion will be arrested by the stimulation of the central end of the vagus. Sciatic nerve stimulation gives the same result indicating the inhi-

bition of the center in the medulla. The normal secretory reflex may be inhibited, as when the mouth becomes parched through fear, cutting off the afferent impulses normally originating from the presence of food in the mouth, as a result of emotional inhibition, so that the efferent impulses do not pass out to the glands, the chorda tympani being practically the sole efferent nerve of secretion.

The same inhibitory vagi action has been demonstrated in relation to the mucous glands of the stomach in the gastric secretion. The cervical sympathetics seem to supply inhibitory fibers for the sweat and lachrymal gland secretion, especially in the facial region and the upper extremities of the trunk, the secretion becoming unrestrained when the cervical sympathetic is divided.

There are also inhibitory fibers in connection with the mammary and sebaceous gland secretions. The anabolic fibers of the salivary glands are inhibitory of the katabolism of the cells, so that if these fibers are divided the gland cells are handed over to the continuous action of the secretory fibers resulting in a continuous secretion till the glands are atrophied. Usually salivary flow results from sensory stimulation of the glosso-pharyngeal and lingual nerves, the impulse passing to the center in the medulla and being transmitted along the efferent fibers of the chorda tympani or the sympathetics, reaches the glands reflexly. The center may be stimulated through the vagi, sciatic or splanchnic nerves or from the psychic centers as in the inhibition of salivation by emotions, fear or fright. It has not yet been fully demonstrated, whether this opposition of the secretomotor and inhibitory actions is independent or is dependent upon circulatory and motor action, or is dependent upon internal stimulation resulting from the mechanical action aroused by the removal of the secretion in its excretion through the duct.

Here it is important to recall the fact that, according to Dr. Deyon, by stimulating the peripheral end of the splanchnic nerve, or the central end of the vagus nerve, the bile duct and gall bladder become contracted, while there is an inhibitory relaxation of the sphincter muscle in the duodenal papilla, inhibiting the opening of the bile duct into the duodenum. While, by stimulating the central end of the splanchnic the sphincter muscle becomes contracted and the bile duct and gall bladder relaxed by inhibition. Thus the pneumogastric has, (1) efferent fibers, which are, (a) inhibitory to the gall bladder and bile duct, and (b) motor to the sphincter; (2) afferent fibers, which produce reflexly inhibitory relaxation of the sphincter and contraction of the gall bladder and bile duct. The splanchnics, on the other hand, have (1) efferent nerves which are motor fibers for the gall bladder and bile duct, and inhibitory fibers for the sphincter; while the ~~visceral~~ splanchnics also have (2) efferent fibers which reflexly produce inhibitory relaxation of the gall bladder and bile duct and contraction of the sphincter.

We have here a splendid illustration of that antagonistic nerve action, called the dual crossed nerve supply, which lies at the basis of the activity of the gall bladder in the storage of bile in the bladder and the excretion of bile into the duodenum. This represents the normal dual activity of secretion and excretion of bile under the regulatory control of the nervous system.

#### V. Inhibition in relation to Excretion.

In the different forms of excretion, the excretory process is a reflex action. The center of micturition at the 2nd and 3rd lumbar may be inhibited either by impulses from the brain or impulses passing up along the sciatic nerve. In the dog whose spinal cord is divided in the dorsal region

reflex micturition may be produced by abdominal pressure or anal stimulation and this may be inhibited by cutaneous friction along the leg. Micturition may also be inhibited by sudden emotion.

The erectile center in the lumbar region may also be inhibited in a similar way. This is of importance as an indication of the manner in which reflex activities may be reached by the use of superficial methods of stimulation. The parturition process, which is both reflex and automatic, depending upon the stimulus of the foreign body in the uterus, may be inhibited in connection with the central nervous system. Emotions have the effect of retarding parturition, the lumbar center being inhibited, causing the cessation of accelerator impulses to the uterus and abdominal muscles. Some claim that the medulla exerts such an inhibitory influence over both micturition and parturition.

In connection with the bladder the nervi erigentes (sacral region) represent the motor (contraction) nerves to the muscle of expulsion and the inhibitory (relaxation) to the sphincter muscles, the hypogastric nerves representing the motor contraction to the sphincter and the inhibitory relaxation to the expulsion muscles. Goltz found that when the central nervous system was cut off in the dog by destroying the lower part of the spinal cord the bladder function was preserved, indicating the independence of the bladder function from the central nervous system, at least in emergency. In the nervi erigentes we find motor fibers for the longitudinal and inhibitory fibers for the circular fibers of the muscles of the uterus and vagina, the hypogastric nerves containing the motor fibers for the circular and inhibitory fibers for the longitudinal muscles.

Inhibition is obtained in connection with the sacral nerves for the vulva, for the unstriped muscle of the penis and the cutaneous muscles around the anus and genital organs. This gives us a double crossed innervation system for the secretory systems of muscles.

#### VI. Inhibition in connection with the muscular system.

In most of the examples of inhibition so far discussed the inhibitory phenomenon comes out as a peripheral function, the nerves having such a function in connection with the center activity. This, however, does not by any means exhaust inhibition, because in addition to such nerves as the pneumogastric, we find the depressor nerve which acts inhibitorily by reflex through the central nervous system upon the periphery vaso-motorly and heart viscero-motorly. Heart inhibition produced by tapping on the abdomen is another example of reflex inhibition. This Goltz experiment of tapping on the abdomen of the frog with the scalpel, producing heart stoppage in diastole is rendered ineffective if the frog's limb is tapped. By removing the cerebral hemispheres from the frog brain and tapping the frog on the back the frog croak is produced. This is inhibited by tapping the frog's leg at the same time. The result may take place either by inhibition or by an opposing reflex causing closure of the glottis. If one limb of a decapitated frog is subjected to irritation it will be moved away from the irritation after a time, but if the other limb is also irritated the movement away will be delayed. The reflex movements of the limbs of the decapitated frog are inhibited by cutaneous stimulation mechanically along the back. The same is true of a decapitated snake, all the rhythmic movements being inhibited by the mechanical stimulation of the body.

In the case of a dog whose spinal cord is divided in the dorsal region the sphincter ani and the rectum manifest rhythmic contractions, but these may be inhibited by mechanical pressure of the foot or of the skin; the rectal rhythmic contractions may be inhibited by cutaneous stimulation. In the guinea pig Brown-Sequard found by hemi-section of the cord the rhythmic

mic contractions of the sphincter ani but these contractions were inhibited by mechanical pressure upon the foot. Similarly reflex erections and micturition can be inhibited by mechanical stimulation of the testicles and legs. We have found in some cases of aggravated constipation and impotency cramping of the muscles along the thigh and contracture extending down into the foot, indicating the existence of this reflex in the human subject.

Similarly, the stimulation of the central end of the sciatic nerve, the stimulation of the central end of the nerve of the flexor thigh muscles, the mechanical pressure of the flexor muscles, or the mechanical extension of these muscles will inhibit the knee jerk. This is produced by the inhibitory relaxation of the extensor muscles and inhibition of the knee jerk. This indicates how inhibition may be brought to bear upon the muscle tone as a means of controlling muscular action. This may explain some cases of loss of knee jerk in pseudo-ataxic conditions.

In line with this we find the experiments made upon the dog, (1) under morphine anesthesia, in which the contraction of the leg could be relaxed by inhibition through mechanical irritation of the cutaneous surface of the body on the same side; (2) by removing the brain above the crura cerebri the tonic contraction of the arm and leg extensors being found. This can be inhibited (relaxation) the the stimulation mechanically of the arms and legs or the nerves that supply these extremities, either in the extremities themselves or at the origin of the nerves in the spinal cord. This indicates the value of inhibition in connection with motor stimulation of the muscles of the extremities, the inhibition taking place reflexly by the central stimulation of a sensory nerve, or by the mechanical stimulation of the cutaneous surfaces of the body.

This was illustrated in a clinic case recently. The man had been lifting a heavy weight, the weight falling away from him in going down stairs. He held onto the weight and evidently strained the entire nervous system. The body, including mouth, face, hands and limbs shook as if palsied. The muscles were cramped in the limbs, abdomen and back. After remaining in this condition over twenty-four hours he was brought for osteopathic treatment. The spasmodic contractions and twitchings of the muscles were controlled by strong inhibition along the spine, the local treatment of the muscles in the arms, legs or abdomen intensifying the cramping and tightening of the muscles, until complete tonicity was restored by reflex inhibition. This demonstrates that inhibition is a vital phenomenon which can be used to great advantage in the treatment of the organism.

Undoubtedly there are inhibitory phenomena which result from the action of the peripheral nerves, the reflex stimulation taking place in the skin, cutaneous tissues or by the stimulation of the central end of some sensory nerve. This may also be applied to the central nervous system. This has lead some to the opinion that inhibition must take place through the nerve centers, either in the central nervous system, the sympathetic or peripheral ganglia found in the visceral organs. This, however, cannot be substantiated. In connection with the vaso-motor phenomena the vaso-dilator inhibition must be exerted directly upon the circular fibers of the blood vessel walls, no nerve cells existing in the blood vessel walls. Therefore, the inhibition taking place in these and other forms of the unstriped muscle must take place without any local cell ganglia. In line with this we find the inhibitory relation of the retractor muscle of the penis, representing the smooth muscle, without any ganglionic cells.

Biedermann has demonstrated that if the abductor muscle of the claw of the crawfish is divided and the claw nerve is stimulated, a slight stimulation will produce inhibitory relaxation of the adductor; but a strong

stimulation produces motor contraction. On the other hand, if the adductor muscle is divided and stimulation applied to the adductor nerve, a slight stimulation causes motor contraction and a strong stimulation the inhibitory relaxation of the abductor. This indicates that both the adductor and the abductor muscles have accelerator and inhibitory nerves. In addition it has been found that the accelerator nerve of the abductor and the inhibitory nerve of the adductor give the readiest response. Here we have an explanation of the antagonistic action of these sets of muscles. By gradually increasing the stimulation of the nerve supply to these muscles, the abductor first contracts, then the adductor relaxes, next the contraction of the adductor and the relaxation of the abductor muscles take place. The same degree of stimulation contracts the adductor and relaxes the abductor, and the same degree of stimulation contracting the abductor and that relaxing adductor muscles. This represents the peripheral action of the inhibitory and accelerator innervation over the striated muscles in the invertebrates, the innervation of the opposing muscles being complementary.

Can we apply this principle to the vertebrate muscle? If so, it will be of special osteopathic significance. In the case of the muscle nerve preparation of the frog, by allowing the end of the nerve to become dried, the muscle is tetanized. After removing the dried part of the nerve and then stimulating the nerve, the tetanus disappears, indicating the inhibitory effect of the drying process upon the nerve, whether in the nerve or end plate is not definitely known. In connection with the electric phenomena of muscle we find that the galvanic electricity gives a response in the form of contraction, only at the make and break of the current, the contraction taking place at the cathode and anode respectively at the make and break. According to Beidermann the contraction alone is apparent, although there is really a relaxation due to inhibition, so that in the tonic condition the anode gives a rapid inhibitory relaxation at the make and a slight relaxation at the cathode on breaking the current. These phenomena are brought out when the animal is subjected to curare and undoubtedly prove that the inhibition (relaxation) and acceleration (contraction) take place within the muscle itself and not in the end plates. Gaskell has proved that by stimulating the peripheral end of the pneumogastric in the tortoise there is a positive variation in the nerve currents and the stimulation of the accelerator nerves to the heart causes a negative variation.

These experiments have led to the formulation of a distinct theory in regard to acceleration and inhibition as factors of vital stimulation. From the standpoint of metabolism and nutrition, we find two opposing processes, (a) dissimilation, on the basis of physical repulsion and chemical disintegration; (b) assimilation on the basis of physical attraction and chemical combination or synthesis (upbuilding). A stimulus in the wider sense includes anything producing reaction in the irritable tissue or exciting to functional activity. The tissue may be stimulated from the standpoint of assimilation which represents inhibition or the increase of assimilation; or from the standpoint of dissimilation which represents accelerator contractility, or the decrease of assimilation and the increase of disintegration. Hence these correspond with the two sides of metabolism, anabolism and katabolism. This forms the basis of the rhythmic, tonic or peristaltic condition of certain tissues and organs of the body where we find antagonistic processes, activities and innervations. This is due to the fact that normally a tonic condition involves a slight contraction, as in the blood vessels, with partial relaxation. Here it is possible to notice the inhibitory phenomena, because there is a previously existing activity. As we have seen in the vertebrate and invertebrate muscle in a state of tonicity, there is unquestioned peri-

pheral inhibition, so that stimulation, as acceleration and inhibition, represent the two phenomena at the foundation of muscle activity.

The rhythm of organs, like the heart, spleen and liver, the tone of the tissues, like the blood vessel walls, and the arrhythm of peristaltic movement, as in the intestines, imply the cyclical changes of activity, inhibition of activity and rest from activity and inhibition of activity. In the condition of contracture found in the experiments on dogs from which the cerebral hemispheres were removed, the tonic and contracted condition of the muscles can be relaxed by inhibition secured through the stimulation of the cutaneous sensory nerves. In this contracted state peripheral stimulation results in relaxation. Hence reflex inhibition (relaxation) and reflex contraction must be placed side by side as muscle phenomena. This is utilized in the application of Head's law, in the relaxation of contracted tissues and the contraction of relaxed tissues. This has been demonstrated by experiment in connection with the inhibitory function of the vagus, the chorda tympani and the splanchnic nerves from their central origin, the fiber as it functions from the cerebro-spinal axis being inhibitory. Here we must remember that the cell determines the function of the neuraxon from the cell. In these nerves, however, both kinds of fibers are found, as in the pneumogastric, where we find that the inhibitory ~~function~~ effect predominates over the accelerator, the inhibitory function being the governing and regulating one in connection with the heart from the side of the cerebro-spinal nervous system. In the case of other nerves the predominance depends on the characteristic of the organ supplied.

The inhibitory and accelerator nerves differ, (1) in regard to the period of latency, and (2) in the after effects, the variation depending on the characteristic of the organ, the result depending on the predominance of acceleration or inhibition. The mechanism of each organ determines whether inhibition or acceleration predominates. In the chorda tympani which supplies the submaxillary gland the inhibition acts through the blood supply, and as the function of the gland is secretory, blood supply determines the gland activity. The chorda tympani has a long after effect in the case of the submaxillary gland and the vagus has a long after effect, as an accelerator function, not as an inhibitory nerve, in the case of the heart. This indicates that throughout the nerve trunks of the nerve mechanism we find both kinds of fibers, so that as stimulation of both kinds takes place simultaneously, the after effects represent all sorts of variations, the long after effect and the short after effect combined together. In case of simultaneous stimulation of the accelerator and inhibitory fibers the inhibition predominates during the continuance of the stimulation, but this does not interfere with the acceleration; it increases the inhibition effect. The result is that after the stimulation is removed and the short after effect passes away, the accelerator function establishes its long after effect. This indicates that the sympathetic or visceral effect persists after the controlling influence from the cerebro-spinal side has disappeared. It is for this reason that the depressor nerve effect of inhibition on the heart is determined from the peripheral part of the blood system in connection with vaso-motion.

Hence behind all the functional conditions of the organism, organs and tissues, there lies this antagonistic activity of acceleration and inhibition, representing contraction and relaxation. They are present in all organic functions, in all the tissues striped and unstriped, in the nerve and muscle cells and can be demonstrated in connection with mechanical manipulations. As both kinds of fibers exist in the majority of the nerve trunks

and as in manipulation both sets of fibers are stimulated at the same time, varying effects may be expected; and as the accelerator and inhibitory nerves have antagonistic activities and long and short after effects respectively, that effect will temporarily prevail representing the short after effect, but that function representing the long after effect will prevail after the temporary effect is past. Hence contraction or relaxation will predominate according to the length of the after effect. Manipulation must be applied with this in view, not for the immediate effect or action but for the reaction.

VII. The central nervous system in relation to inhibition both directly and on a reflex basis.

We have seen that stimulation assumes an accelerator and inhibitory form in the peripheral nervous system. There is, however, the same phenomenon in connection with the central nervous system in the main functions that are regulated and governed centrally, respiration, cardiac action, deglutition, the rhythmic and arrhythmic movements of the organs and tissues in the internal viscera.

Inhibition presupposes a previous inherent activity which is contemporaneous with the origin of vitality and the vital processes. The great central parts of the central nervous system are concerned in the vital phenomena. The optic thalami and corpora quadrigemina are believed by Setsohenow to be centers of inhibition for all the reflexes of the spinal cord, the reflexes being delayed in their action by the stimulation of these brain bodies, that is, via co-ordination. This rests upon the fact that the spinal cord centers have their homologues of control and regulation at the different levels in the brain. Embryology, for example, has proved that the cerebral cerebellar and basal ganglia development marks the evolution of control over the spinal reflexes. In the simple forms of animal life without brain the spinal reflexes are absolute, whereas in the complex brain development the spinal reflexes are placed in subserviency to the subconscious and conscious centers. This inhibitory function has been made specific, according to Ott, who claims that the optic thalami represent a center of inhibition in connection with peristaltic movement, others gaining an inhibitory effect by stimulating different columns of the spinal cord, the cerebellum and the corpora quadrigemina.

Sherrington reports experiments upon the monkey of interest. When under anaesthesia he found rigidity of the muscles, and by stimulation of the cortical brain regions for the flexor muscles contraction took place with relaxation of the extensors; while by stimulating the extensor cortical area the extensors contracted and the flexors relaxed. As a result of his experiments he points out that the cortical brain region for inhibition (relaxation) of the muscle groups is found in the area for acceleration (motor contraction) of the antagonistic muscles. He found also that after dividing the third and fourth cranial nerves, and therefore paralyzing all the muscles of the eye, except the external rectus, no movement of the eye to the right was possible; yet, by stimulating the frontal or occipital region of the brain, or the internal capsule after the removal of the brain, the left eye moved to the right, indicating the inhibition of the rectus internus. This indicates that the inhibitory phenomenon takes place below the cortical region, the inhibitory action resulting from stimulation of the cortical area affecting one muscle and the motor action in antagonistic muscles.

In the case of the superior laryngeal nerve and the second trigeminal branch and the splanchnic, by stimulating the central end there is contraction of the expiratory and relaxation of the inspiratory muscles. The nervous system, therefore, is not only the medium of conveying impulses from



the central nervous system to the muscles, but represents the medium of binding together the different muscles that have antagonistic activities, on the basis of which the one contracts and the other relaxes. This represents the reciprocal activity of the complementary nerves, in connection with which stimulation produces acceleration of one group and inhibition of another group of muscles. Hence when one muscle or group of muscles contracts the antagonistic muscle group or group of muscles relaxes. Thus the nervous system from its central side forms into combinations for the complementary activity of muscular actions and probably for the complementary activity of all the vital processes of the organism.

This forms the basis of the reciprocal innervation, as Sherrington calls it. But what is the relationship of the great brain centers to this phenomenon? By the doctrine of irradiation, for example, lung distension which inhibits the respiratory center, acts as an inhibition of the vasomotor and cardio-inhibitory centers, so that in this way irradiation unites in the great brain centers the phenomena of acceleration and inhibition, producing co-ordinate and harmonious activity on the part of the brain and the entire body. Hence the inhibition of a center by an afferent impulse from the specific organ presided over by that center influences other centers by the principle of irradiation of impulses that takes place in the cortical sphere. All the brain centers may exert an inhibitory action upon the other centers, thus influencing inhibition by not only the spinal cord centers, but the reciprocally related centers of physiological action in the brain.

#### VIII. The relation of inhibition to sensation and volition.

Not only does the central nervous system deal with impulses inhibitorily that are brought in afferently, to be carried out again efferently to the peripheral parts of the body. Afferent impulses pass into the sensorium and are dealt with there as in a terminating receiver. Are they dealt with from the accelerator or inhibitory standpoints? Apparently sensory impulses may be inhibited either from a reflex or a central origin, Setschenow points out that by gently tickling some cutaneous specific parts of the body, the sensation of pain felt by placing the hand in an acid solution can be lessened and even removed. The painful sensation produced by an electric current may be counteracted by another electric current applied at a different part of the body. If one hand is heated until the sensation of warmth is felt this may be counteracted by heating the other hand to the same degree of warmth. I have found that when one hand becomes pained by the sensation of cold, to warm the other hand will restore equilibrium of heat to the cold hand without producing the prickling sensation found by heating the freezing or frozen hand. If a ligature is bound loosely around the upper part of the limb of a frog, while it is on its back, all power of movement is lost. Pressure applied over some of the internal organs, in such an animal as the rabbit, inhibits the movement of the lower limbs.

Side by side with this is the question of whether voluntary movement can be inhibited. The tonic and tonic contractions of the sphincter ani can be inhibited voluntarily. The action of the spinal cord cells may be inhibited by the brain. Ladd says "the phenomena of inhibition, when connected with inhibition, are familiar enough; for example, one may voluntarily restrain these movements of one's leg which the cord, if left to itself, would produce as the result of tickling the soles of the feet. But the brain, without conscious volition exercises the same inhibitory action over the spinal cord. If a frog is suspended by the head and its legs allowed to dip into a vessel of dilute acid, the interval between the contact of the acid and the withdrawal of the legs is considerably lengthened when the spinal cord re-

mains undivided below the medulla oblongata; that is to say, the cord alone withdraws the legs quicker than the cord when influenced or inhibited by the brain. The interval between the application of the acid and the contraction of the muscles can also be prolonged, when the brain is still connected with the cord, by applying chemical irritation at the same time to the optic lobes; that is to say, the cord is hindered from performing its reflex motor function by the stimulation and consequent influence upon itself of the higher nervous center." Setschenow in a paper published in 1863 advocated the view that a special inhibitory mechanism exists in the brain centers, the inhibition passing by specific nerve paths in the spinal cord. This is probably true, although Ferrier, Brunton, Ladd and others claim that it represents simply a part of the general modifying influence of the central organs according to the function, structure and degree of stimulation entering these central organs of the central nervous system. (Ferrier, Functions of the Brain, 1876; Lauder Brunton, Inhibition, in West Riding Reports, Vol. IV.)

Does cardiac inhibition represent the same or an analogous phenomena? Can a voluntary movement be inhibited voluntarily? or is it explainable on the basis of the action of antagonistic muscles. This seems reasonable on account of the fact already referred to that the cortical organ for inhibition is the same as that for contraction in the antagonistic muscles. According to Warren and Bowditch the voluntary contraction of some of the muscles some time prior to the tendon blow in the case of the knee jerk gives an inhibition of the knee jerk, indicating that before each contractile impulse there passes a short inhibitory impulse, preparing for the contraction caused by the contractile wave. Voluntary movements may be inhibited by artificial stimulation, especially in the way of quickening the relaxation that takes place voluntarily. The viscera normally do not fall in the realm of consciousness. The activity of the stomach should not make any impression upon consciousness. Similarly heart beat should be independent of sensitiveness. All of these and the other viscera are subject to sympathetic control. Hence the viscera represent the field of low sensibility. They have an abundant supply of sensory nerves, but these should function without consciousness, and if the sensory stimulation enters the field of consciousness, it does so as representing a more highly sensitive area. The cerebro-spinal nerves are those of consciousness and they act as transmitters of the impulses from the highly sensitive areas and also from the less sensitive sympathetic areas centrally associated with the highly sensitive areas.

Inhibition diminishes pain in the area of conscious sensation and therefore it affects, not only the highly, but also the less sensitive areas. Therefore, inhibition, (1) checks conscious pain, (2) stops or cuts off those reflex impulses that originate from the painful condition, and (3) arouses the center to counteract the primary irritation. Hence the inhibition produces an inhibitory relaxation of the voluntary and involuntary muscles involved, lessens the degree of voluntary and involuntary sensitiveness and shuts off that succession of irritated reflexes that keeps the organism in a state of excitement; and in their place it establishes reparative reflexes affecting the blood, muscular, secretory and excretory activity.

#### IX. Relation of inhibition to hypnotic phenomena.

It is possible that an individual may be brought under the influence of hypnosis. According to Kircher a fowl can be hypnotized by putting its beak to the ground in front of a chalk line. Some animals are hypnotized by sudden action, such as altering the position of the body. In hypnosis there is cerebral preoccupation which implies the extreme limit of preattention. According to Berthelm there is no evidence of the sleep condition in hypnosis, because in normal sleep there is a very slight difference in excitability,

whereas in hypnosis the excitability becomes very unequal, one form of stimulation an effect while others may be without any effects. The individual becomes purely automatic, the stimulus in suggestion form producing in connection with the cerebral cortex an idea that is subject to the will and control of the hypnotist. The idea is purely subjective and the psychic condition is of the nature of credulity. This represents the devolution towards a more primitive condition such as we find in infancy, in which automatic action is more apparent than in the normal developed individual in whom reflection has been cultivated by educative processes. Hypnosis represents, therefore, one of the conditions in which mind influences the body, other examples being found in mental attitudes which affect body conditions in connection with disease.

Heidenhain attempts to explain the phenomena by the inhibitory nerve action. Hypnosis, according to him, affects, (1) the sensorium, that part of the nervous system which received impulses from the special sense organs. In hypnosis, if slight, there may be vivid recollection of all that took place; or, if deep, there may be no recollection at all.

The cerebral hemispheres are the seat of the higher mental activities, while the lower sensory ganglia receive all sensory impulses at first, and may send out motor impulses from the lower motor ganglia. The one part may work without the other. In hypnosis there is a condition in which the nervous apparatus associated with consciousness is suspended and the movements are those of the imitative kind. To account for these he takes inhibition which plays such an important part in all nervous activities. While the spinal cord cells are the principle reflex centers, the spinal reflexes may be inhibited by cerebral action. Hence if one set of sensory cells in the brain becomes highly irritable by excessive sensory stimulation, the resultant may be inhibition of the voluntary motor apparatus. Similarly the activity of the sensory nerve cells may be inhibited. Hence "the cause of phenomena of hypnotism lies in the inhibition of the activity of the ganglion cells of the cerebral cortex \* \* \* \* the inhibition being brought about by gentle prolonged stimulation of the sensory nerves of the face or of the auditory or optic nerve."

Thus the areas of voluntary motivity are suspended, the movements resulting being involuntary, imitative and dependent on the impressions made upon the senses. Nerve activities depend upon the activity of the cortical areas or the deeper ganglia centers. Among these ganglia centers, the optic thalami receive cutaneous sensory impulses, the corpora quadrigemina retinal light and color impulses, the corpora striata acting as motor centers from which impulses pass to the groups of muscles. In conscious and voluntary movements the sensory stimuli pass first to optic thalami, as tactile sensations, to the corpora quadrigemina as visual sensations thence to the cerebral cortex where volitional impulses would originate to be sent down through the corpora striata as motor impulses to the spinal cord and thence to the groups of muscles, resulting in movements. If the voluntary centers are suspended, these nervous impulses would not pass to the cerebral cortex, the movement in this case being purely automatic, without any psychic regulation or interference. Common illustration of this is found in the sudden paralysis of voluntary movement, following sudden and powerful sensory stimuli, such as fear or impending danger.

(2) It affects the periphery. This is specially illustrated in the stiffening by reflex spasm of certain voluntary muscles. Striking the skin over the biceps muscle results in rigid flexure of the arm. The irritation of a sensory cutaneous nerve causes an impulse to pass to the spinal cord and from thence it is transmitted along motor nerves to the muscles, re-

sulting in involuntary movements or activities. In cough the irritation of the larynx excites the sensory pneumogastric nerve fibers, the muscles of expiration being aroused by reflex. These reflex centers are partially under cerebral control, and if this control be removed or suspended then the responsiveness is increased. Hence if part of the skin is stroked the intensified reflex will first stiffen the muscle, next the skin, and as the sensory stimulation continues, and increases in intensity the deeper muscles become rigid. Hence, if the reflex irritability is slight only those muscles which lie close to the skin contract, single muscles and groups of muscles being affected in this case. The stimulation of the skin over the sterno-mastoid muscle produces the oblique stiff neck. If the irritability is increased in strength and its duration lengthened, then the contraction becomes diffused.

The gentle stroking of the ball of the thumb affects the flexors and adductors of the thumb. Then stroking the fore-arm muscles firmer, the flexors of the fingers contract. Extend the irritation upward and the entire arm and shoulder can be thrown into absolute fixation.

Heidenhain states that the following order of groups of muscles is affected, some seconds intervening between group and group, "left thumb, left hand, left fore-arm, left upper arm, and shoulder, right shoulder and arm, right forearm, right hand, left leg, left thigh, right thigh, right leg, muscles of mastication, muscles of the neck." How is this rigidity overcome. "I strike forcibly the left arm and the rigor at once disappears. Instant relaxation of the whole body occurs also when I forcibly extend a finger of the clenched fist." These reflex inhibitory phenomena when extended to the eye, face, blood, heart, stomach, etc. explain many of the perverted sensations found in hysteria and nervous diseases, indicating peculiar sensations found in hysterical physiological conditions aroused by perverted activity of certain parts of the cerebral <sup>nervous</sup> system. The far reaching effects of such on the conscious and unconscious life are of great importance.

### C O N C L U S I O N S .

It is difficult to formulate, even with the material presented before us, any satisfactory theory to explain inhibition. The American Text Book of Physiology claims that inhibition developed in the central nervous system "is not produced by a special set of nerve fibers, but is the result of the action of several incoming impulses, arriving by different paths, on the responsiveness of a given cell. \* \* \* To obtain inhibition there must be at least two pathways by which impulses reach a given cell and the two stimuli must tend to excite different reactions. When they tend to excite the same reaction a reinforcement follows. The inhibition, therefore, is connected with the effects of these two sets of impulses upon the responding cell. and that is always associated with the fact that as the two paths end in different relations to the cell, the impulses must enter at different points, and hence in the first instance tend to act on different portions of the cell contents." (Am. Text Book, p. 667.)

A few points will summarize our conclusions. (1) The activity of vitality has as its fundamental basis antagonistic factors, and these represent from the standpoint of irritability, accelerator motivity and its inhibition or resultant contraction and relaxation. Every irritable tissue when stimulated gives its response in some form of activity or in the inhibition of already existing activity. In fact stimulation when applied to such irritable tissue results in both activity and its inhibition, but in the long run one of these phenomena prevail, so that the opposition of the two elements is irritability is fundamental to tissue existence; and the final tissue in relation to

irritability is the resultant of these antagonistic activities. While contraction or relaxation may predominate neither one entirely destroys nor supercedes the other, so that both are essential to tissue irritability.

(2) Vital functionality is determined by and dependent upon these two antagonistic factors or phenomena. So long as tissue is vitalized there is no absolute rest, neither is there absolutely unrestrained activity. Every function of tissue as such and of organized tissue in the body organs and tissues depends upon the play of these opposing elements in the vital existence. Hence there is no such thing as pure activity, each functional activity consisting of complementary activities. Wherever vitality exists or manifests itself, in the irritable tissues of the body, and all tissues are irritable, muscle, nerve, epithelial and connective tissues, there we find these complementary activities. In sensation, motion and secretion, central as well as peripheral, voluntary or involuntary, these accelerator and inhibitory phenomena are present, in fact are vital phenomena.

(3) So essential are these two factors of vitality that in the differentiation of nerve tissue, both fibers and cells, the functions of a activity and inhibition of activity become specialized in particular cells and fibers, whose prevailing characteristic becomes that of accelerator motivity and inhibition from the functionally point of view. Life then, in connection with the tissues and tissue development, organ formation, activity and co-ordination, is the manifestation of certain phenomena resulting from and dependent on these dual elements and processes of life.

(4) Osteopathically, the significance of this conception of objective life and its phenomena can hardly be fully appreciated, because of the far reaching consequences involved in its application to our therapeutics. Every disease cannot be reduced to an osseous lesion or a structural malformation or deformation. Functional disorders and derangements are found in the pathology of disease. To rectify these, the power of stimulation mechanically, represents an open door to recuperation. Stimulation may take place along the normal life line of any functional process, the tendency to normalize being an inherent one in the organism.

This tendency to the normal represents the reactive power of the organism, and unless such reactive power is found in the patient, more particularly in acute diseases, recuperation is impossible. The distribution and redistribution of impulses along normal lines represents the co-ordination of all the complementary activities, the sum total of which represents organic life. But how do we know which to appeal to? Nature teaches us that the therapeutic impulse of correction, stimulation or inhibition, will pass out along the pathway of least resistance, and in doing so will find its way to that part of the organism that is weakest and most in need of aid.

Hence to stimulate is to increase or decrease activity on the basis of motive contractility or inhibitory relaxation. This is the mechanical therapy of physiological activity. And this dual conception of the activities of life is essential to the physiological foundation of the osteopathic system. Much work has been done in the physiology of recent years to place on a secure foundation the accelerator and inhibitory aspects of vital activity. The physiology of the future will undoubtedly do much to make this clearer, as the basic conception of the organic life. To apply the mechanical stimulation and inhibition in such a way as to cause their conversion into the corresponding physiological equivalents in the organism is one of the great questions of osteopathic physiological physics. The possibility of this forms the physiological foundation of our therapy.

Dr. Pearl A. Bliss, in the Journal of the American Osteopathic Association, August 1907, reports a series of experiments of great value. (pp. 465-6). Inhibition of the second to fifth dorsal one minute lowered blood pressure from 116 m.m Hg to 110 m.m. Steady inhibition at the second to sixth dorsal produced the reflex dilatation of the pulmonary vessels, making respiration shallow and slow. Splanchnic inhibition causes splanchnic dilatation, lowering the blood pressure all over the body, depleting the pulmonary blood vessels and making respirations quicker and deeper.

(5) The nerve fibers can be mechanically stimulated and inhibited. The question is therapeutics is, can this have a curative value? Certainly! For example, in muscular contractures, which are very frequently found, the inhibition relieves the contracture and allows the functional processes to operate normally. Whether these contractures are due to external conditions such as cold, or to internal influences arising from organs or even from the spinal column, the contraction is a lesion and as such must be corrected. In many cases the osseous lesion is the result of the muscular contracture and the complete relaxation of the muscles will correct the osseous lesion.

Inhibition is spoken of and taboed as purely sympathetic. True; but it does not mean neglect of physical diagnosis. Inhibition is called for to control sensitiveness and tenderness along the spine, to quiet a patient after corrective treatment, to soothe and subdue an excited heart, to control nervousness, to relieve the pain and neuralgia that are symptomatic of pressure from tumors, excitement in inflammation, etc.

The inhibitory treatment is of more value than stimulating treatment because its effect is soothing and quieting and the relaxation of soft tissues, this latter, in many cases, being the primary lesion. We do not claim for it sole value but simply value as part of the treatment either to assist corrective work, or to lead up to corrective measures. As such, especially in dealing with acute conditions, it is an important means. No Osteopath can neglect it.

The neurone is the unit of structure in the anatomy of the nervous system. The reflex is the unit in the physiology of the nervous system. A simple reflex, such as lies at the foundation of the visceral system consists of: (1) A nerve center with at least three nerve cells, or some multiple of three cells; (2) Two nerve supplies: (a) one to the center, and (B) one from the center; (3) Nerve terminations, or terminals in connection with the plate or end organ system, or the tissues; (4) Stimulation of some kind, from some other part of the nervous system.

There are three kinds of cells in each center: (a) the afferent, or receiving cells (b) the central or modifying cell; and (c) the efferent or distributing cell. A and B represent the points of junction between the center; (1) the afferent (sensory) and (2) the efferent (motor nerve fibers.) We may have a simple or complex reflex. In a simple reflex an organ or tissue is connected with another organ or tissue through one single center. In a complex we have a series of simple reflexes, all of the series being connected.

The basic physiologic principle of the reflex is irritability. Secondary to this we find conductivity, or the power of conducting impulses. Mobility as the ultimate primary property is the power of moving under the influence of motor impulses. Hence, the three essential properties possessed by all living tissue, in other words, the physiologic properties of living tissue, are (a) Mobility, (b) irritability, (c) conductivity or contractility. Even a plant has the power of turning to or from the light. This vital characteristic of plant life is called tropism. This may assume

different forms, for example, heliotropism, that is, the power of turning to the sun; hydrotropism, the power of turning to the water.

The value of the reflex from the osteopathic standpoint depends on this, that manipulation always appeals to one or more of the reflexes. These reflexes are distributed all over the body. They are determined by stimuli furnished through the different organs of sense. Hence, the surface of the body, internal and external, in relation to the skin, muscles, bones, ligaments, fascia, is the terminal in which the nerves complete the reflex (structural.)

The centers are found in the cerebro-spinal and ganglionic sympathetic masses. The great problem of osteopathic treatment is how to affect in the easiest and best way this reflex mechanism. The method of reaching the reflexes will depend: (a) on the form, and (b) on the relationship of the tissues, that is, the relationship of one tissue to another. If the form and relationships are abnormal then there exists an unsympathetic condition and it is this that produces the symptoms of disease. Behind these symptoms there lies the cause, in the disarrangement or disorder of the vital processes. In other words, the lack of sympathy is expressed in the form of irritation. Where irritation exists the functions are either above or below normal and this involves the cerebro-spinal reflexes.

All these visceral organs have some kind of sympathy with one another and whenever there is a disturbance of that sympathy there is a disorder or derangement in the vital processes (the physiological functionings.) These vital processes are developed in and through different fields of the nervous system: (a) primarily in the field of the simple reflexes; (b) secondarily, in the field of the complex reflexes; and (c) lastly, in the matured body organism, in connection with organic centers, the unifying influence or force being the vitality. This means that these centers are the basis of the complicated reflexes, the educated simple reflexes, that lie at the foundation of the vital activities.

The first great class of centers is located in the brain—the cerebrum, representing the last center to be developed in the nervous evolution. These centers represent in function the psychological or psychic (subjective mind, but operating through the objective mind) field, sometimes called the volitional field. The second (the voluntary) field of centers represents that class of centers that is not limited to any particular center or group of cells, but represents a mental relation (the objective mind proper) to the nervous system as a whole. The majority of the cells are located in the brain and represent the highest type of vitality. These brain cells are closely associated in form or structure with the bioplasts or the microzymes, one or more of these being required to form a cell. The bioplast is the unit of life or of living substance in its most vital form. It is found, when organized, in the nucleus of the cell. When not organized, that is, when it is naked matter, it represents living matter that holds itself together without any cell wall to keep it in form or structure. From the disease side germs are the result of a degeneration of these bioplasts.

The third field of centers is found in the medullary field, located in the medulla. This field represents the differentiated vital processes, distinguished from the vital force of the single vitality associated with the centers in the second field. Here the vital force represents the fundamental control principle of life that animates all the vital processes. These processes represent the activities of each particular tissue and organ, e. g., there is a vital process in relation to the activity of the heart, liver, spleen, pancreas, etc. This gives us the particular vital activity and we have to remember that these activities are differentiated in the medulla centers, uni-

fied in the brain centers, taken as a whole.

The fourth field of centers is represented by the cervical ganglia of the sympathetic system (superior, inferior and middle cervical ganglia representing the brain of the sympathetic system, conjoint action and operation.) These all act together as one great sympathetic center and may be called the brain or head of the entire sympathetic system. This means that all the sympathetic vital processes are controlled from this center in connection with the vital, organic or visceral movements. The three great functions of the sympathetic brain are (1) vasomotion, (2) visceromotion, (3) temperature, and (4) sympathetic co-ordination of the splanchnic function. The great function of the sympathetic system is acceleration and these three ganglia represent this function in its highest form, particularly in relation to all sympathetic activities. For example, the great vasomotor center is located in the upper cervical region, so that to affect the vasomotor function a general treatment in the cervical region is called for. The normal function is acceleration. Hence if you want to accelerate give stimulation in the cervical region. If we want to diminish acceleration, inhibit in the cervical region. The temperature center is also located here, that is, the great thermogenic center is located in the upper cervical region. The great splanchnic function is located in this region. The splanchnic function is visceromotor, differentiated from the vasomotor function. The visceromotors control the motor functions of the viscera; the vasomotors control the activities of the bloodvessels. Visceromotor acceleration has its center in the cervical sympathetic ganglia.

The fifth field of centers is the field of the solar plexus. This is the field that is sometimes called the abdominal brain, but in reality is not the abdominal brain, but the trunk brain. Here we have a mass of nerve tissue lying back of the stomach against the aorta, extending along the descending aorta. The function of this solar plexus is to unite and concentrate all the nerve activities or processes that take place among the thoracic, abdominal and pelvic organs. In this respect the solar plexus is the cerebellum of the sympathetic field. On this analogy the cervical ganglia would correspond to the medulla. Subordinate to this trunk brain, representing the regional centers, we find the HYPOGASTRIC PLEXUS, which controls in subordination to the abdominal brain the pelvic organs, also the pelvic plexuses.

In epigastric pain, or in epigastric fainting inhibition is applied to the solar plexus. To inhibit the solar plexus apply pressure over the stomach, pushing upward and backward so as to press the solar plexus against the aorta. In pain of the uterus and ovaries give inhibition right over the hypogastric plexus. The hypogastric plexus is located just below the level of the kidneys on either side of the abdomen. Best located for treatment just below the liver or just below the lower end of the floating ribs, pressure being exerted inward and downward.

The sixth field represents those centers located in the spinal cord. Here we have two sub-classes: (a) the reflex centers, and (b) the automatic centers, which are really educated reflex centers. We have illustration of these centers in the cilio-spinal centers, an automatic center located at the second and third dorsal vertebrae. The spinal centers have as their principle functions (1) reflex action and (2) co-ordination, that is, co-ordination in connection with the vital processes, that is, the center keeps one process in line with every other process. Here the action of the center is either (a) rhythmic or (b) arrhythmic. All organs or tissues have an inherent power of acting and reacting. This is called the rhythm of the tissue of organ. Remember that the rhythm means both the action and the reaction. This is to be distinguished from the co-ordinating and controlling power that is exerted from the higher centers; either, (a) volitional from the brain, or (b) automatic from the spine. For example, the heart has in its muscles an inherent force



that makes it move. This movement is controlled and regulated: (a) from the spine automatically, and (b) from the brain voluntarily and volitionally. The same thing is true of every other tissue of the body. Mobility or activity is the resultant of at least two activities.

This is a point of great importance in the osteopathic field that the power of movement (fundamental mobility) is located inherently in the tissues. It is only the control of this inherent movement that takes place from the general nervous system. That is, rhythm and peristalsis are not caused by the nerve centers but they are co-ordinated activities, co-ordination taking place from the nervous system. All the activities in the body, in this sense, are correlated. This is the basis of the co-ordination of functional activity, and also the basis for treatment— a co-ordinating treatment by articulation.

When the functional activities are not working together in harmony, for example, the control of the circulation belongs to the spine as a function controlled from the different regional centers in the cord. Even the circulation of the spinal cord itself is co-ordinated with the circulation of the spinal muscles, so as to form a basis for the control of the circulation in the rest of the body. This means that the nerve supplies in the spinal muscles and spinal cord are correlated, because they originate from the same source, for example, in hyperaemia of the spinal muscles we find anemia of the spinal cord and vice versa. The same thing is true of hyperaesthesia and anaesthesia. Here too many nerve impulses or too few nerve impulses are localized at one particular point in the body organism, that is, the defect is one of distribution. This means that to correct the distribution we must establish a normal correlation. This co-ordination of organic activities is dependent on correlation. This correlation is based on:

(1) The nervous system. The central nervous system consists of a mass of neurone cells, communicating with all parts of the nervous system. The neurones including the cell, neuraxon, dendrons and dendrites. In the nervous system there are different media of communication (distribution): (a) motor pathways, (b) sensory pathways, (c) vaso-motor pathways, (d) secretory pathways, (e) sympathetic pathways (in connection with the gray fibers); (f) cerebro-spinal pathways (in connection with the white fibers). NOTE: The latter two represent what are technically called the communicating fibers. The six represent the paths between the central nervous system and the different organs and tissues. These paths are the links that bind the chain of the nervous system together and also bind the nervous system to the body as an organism. Hence, this great system of pathways represents the first great means of correlating the functional activities of the body.

(2) The fluids of the body represent the 2nd means of correlation of the functional activities of the body. These fluids include, (a) the blood, (b) the lymph. The BLOOD represents the fluid tissue of the body and at the same time the fluid medium for conveying nutritive matter from one part of the organism to another. The blood is a tissue and is also a constituent part of other tissues. A tissue consists of cellular and intercellular elements. In the blood we have both of these, so the blood is a tissue as well as a fluid. The blood also acts as a stimulus, for example, non-aerated blood is a strong stimulus to the activity of the muscle through which the blood passes. Note particularly the peristaltic activity of the muscles in connection with the alimentary canal. If this peristalsis becomes too great there is too much venous blood and this causes a train of symptoms, for example, pain, cramps, rigidity in the intestinal walls. These are symptoms of over-stimulation and indicate hyperaesthesia, that is, the necessity for a change in the quality of the blood. This means that it calls for the removal of venous blood and the throwing in or driving in of arterial blood. For example, dysentery re-

presents this condition and the best treatment for dysentery is the drainage of venous blood from the intestines and a free circulation of arterial blood through the intestines. Any change in the nature of the blood in the stomach or intestines or both has a direct effect on the body and consequently modifies the action of digestion, absorption and assimilation as well as elimination, that is, these are different processes that take place in the body in the course of nutrition. This explains why those disturbances of the stomach and intestines have such a profound influence on the system as a whole, and react on the nervous system.

A change in the condition of the corpuscles of the blood also alters the nutritive function, because these corpuscles discharge the function of nutrition in relation to the body tissues. There are four general types of corpuscles: (a) the white blood corpuscles, or cells; (b) the red blood corpuscles, or denucleated blood cells, (the white cells are the only true cells in the blood); (c) the blood plates, and (d) the blood granules. Some writers classify a fifth type. They call them microcytes, minute bodies which may or may not be cell bodies, that is, may or may not be micro-cells. These, however, are abnormal and are found only in pathological conditions of the body.

The white blood cells are the real living cells of the blood as a tissue. They are living amoeboid bodies with a movement representing the animal element of the blood. They also have the power of digestion, assimilation, secretion, excretion and reproduction. They are sometimes called leucocytes, also some are called phagocytes on account of their police function as the scavengers of the blood. The white cells originate embryonically in the thymus gland and when mature they reproduce themselves. The spleen, in early life at least, is the nursery in which they are brought up.

The red blood corpuscles represent the disintegrated bodies of the white corpuscles, consisting principally of proteid matter metabolized and reformed in the spleen and the liver, that is, in the tissues that form the basis for nourishment, containing within themselves C, H, O, N, P, or S.

The plates, or plaques, are nucleo-proteid, that is, the proteid of the nucleus of the white blood cell when it is broken up. The principal characteristic of this corpuscle is that it is more refined, more delicately constituted, representing real bioplasmic substances. This nucleo-proteid is the basis of nutrition, especially of the nerve tissue and forms the solid constituent of the cerebro-spinal fluid.

The granules represent the fatty matter, resulting from the disintegration of the white blood corpuscle and goes to the nutrition, particularly of the nervous system in the formation of fat in the nerve tissues, viz., the lecithin element. This is the name given to the fat of the nervous system.

All of these corpuscular elements have a function in relation to nutrition and without these nutrition would be impossible. The microcytes are abnormal types, particularly of the red corpuscles, in which there is an abnormal nucleation, found only in pathological conditions. In the spleen the white cell is denucleated, then the body of the white corpuscle is either broken up in the spleen or else transferred to the liver to be broken up. In the liver, also, the nucleus part is broken up: (a) the proteid is picked out of it as nucleo-proteid; (b) the fat element is taken out of it; (c) the remainder of it is broken up into fragments which are metabolized in the liver or thrown out into the blood.

These minute disintegrated elements of the broken up white corpuscles are again moulded together in the red marrow of the bone. Here we have the simple blending of disintegrated parts with the process of haemoglobinizing.

(3) The continuity of the tissues is a basis for correlation, that is, correlation takes place by this continuity. This is of importance principally in connection with the mucous or serous membranes, representing the coating or covering of all the internal organs. This coating is continuous-mucous- all the way through the alimentary canal. For example, in hemorrhoidal cases the mucous membrane of the rectum is involved and yet there are effects noticed in other parts of the mucous membrane field by continuity of the membrane. Also, a varicose and engorged condition of the blood is sometimes found in the stomach, oesophagus and even in the mouth.

Another illustration is found in connection with the presence of worms in the system. They are located in the alimentary canal, irritating the mucous membrane, the irritation being manifested by (a) whiteness around the lips, especially the upper lip; (b) whiteness of the skin, particularly from the nose outward; sometimes from the angle of the mouth to the angle of the jaw; (c) irritation of the nasal mucous membrane, manifested in children by the picking of the nose. An itching or irritating sensation of the nasal mucous membrane.

Another illustration is found in the spinal canal, where we have a continuous membrane through the meninges of the brain and cord. In cerebro-spinal fever, or cerebro-spinal meningitis, sometimes called "spotted fever" spotted because of the appearance around the spine of spots in the form of a rash or eruption, the irritation of the skin being caused by primary irritation of the meninges of the spinal cord. Spotted fever is sometimes confused with measles and in some cases with cerebro-spinal meningitis. This spotted condition is found particularly in the upper dorsal area and at the second and third lumbar, these being the two points where spinal conditions are to be traced. The reason for the appearance on the surface of the skin of spots is the connection of the spinal cord mucous membrane and skin or sub-cutaneous surface. In some cases cerebro-spinal meningitis results from measles, because of the measles toxin passing into the meninges and setting up an inflammatory condition.

The muscles extending from the point of origin to the point of insertion may also represent the continuity of tissue, for example, whatever effects one point may be transmitted to another point in the muscle by continuity. For example, in some cases of vaccination where there is injection of a virus into the muscle substance, the muscle may become affected or infected, or both. In this case the muscle becomes thickened, hardened and sloughs away. The peritoneum is another structure in which we find continuity, peritonitis following any affection or infection of the peritoneum. For example, more patients die of peritonitis than of appendicitis where the appendix is involved, the affection passing to the peritoneum from the appendix.

Any loss of continuity in these tissue structures, or any interference with the continuity by obstruction may cause some type of disease; for example, typhoid fever, representing the loss of continuity in the tissues of the small intestine. A small portion of the intestinal wall passing into a state of malnutrition, degeneration or suppuration, furnishing the field for the lodgement of germs or their toxins. The condition in this case is not produced by the germ but by the malnutrition, which breaks up the continuity of the tissue. Other illustrations are numerous, such as embolism and thrombosis, representing a change in the blood tissue. Broncho-pneumonia, bronchitis, pneumonia. The first type of pneumonia being the most common, beginning in the bronchi, and travelling through the lungs by continuity.

(4) The fourth means of correlation is the vaso-motor nervous system. This is one of the first parts of the nervous systems to be formed, the formation taking place in connection with the settlement of certain cells in

the spinal canal from the second dorsal to the second lumbar. These cells send out nerve fibers which lie at the basis of the tonic state of the entire blood vessel system. Here the correlation depends on the nervous system plus the blood vessel system. The stimulation of the vaso-motors gives tone not only to the blood vessels, but acts as a tonic to the entire tissue organism. Primarily the vaso-motor nerves are distributed to the blood vessel walls; secondarily all the tissues are affected through the blood vessels, because blood vessel tension reacts on other tissues. There are two sets of these vaso-motor nerves: (a) Those that are stimulative in function, called the constrictors; (b) those that are inhibitive in function, called the dilators.

The muscles in the blood vessel walls are kept in tone directly through these nerves, acting in opposition to one another, and indirectly the muscles in the blood vessel walls react on the muscles throughout the entire body. This gives us a most complex and widely distributed system of nerves in which all the nerves have a uniform function, viz. to maintain tone in the entire organism. The best tonic, therefore, in osteopathic therapeutics, is a vaso-motor treatment—the great palliative treatment. This vaso-motor treatment consists of:

(1) Thorough relaxation of the muscles by inhibition. The muscles along the spine when contracted disturb the function of the vaso-motor nerves and produce contraction of the peripheral blood vessels, resulting in the increased blood resistance in the small arteriole circulation. This means that the small arteries in the spinal cord and through them the spinal muscles become tense and contracted, the tension causing the resistance. The principle of this treatment is the application of Head's Law applied to the blood, the point of low sensibility being the spinal cord and of high sensibility the spinal muscles. Superficial anemia (muscular) implies deep hyperemia (spinal) and vice versa. Hyperaesthesia and anaesthesia of the nervous system causes similar conditions. In the one case hyperaemia produces a congestion of these centers resulting in inhibition of the action of the centers; that is, hyperemia causes the increase in the volume of blood which temporarily destroys the action of the nerve centers on account of the engorgement with blood. Anemia acts as an irritant to the spinal centers, because anemic blood is venous blood and the strongest irritant is that caused by deoxygenated blood in which there is an excess of  $CO_2$ .

(2) Articulation of the spinal column in the vaso-motor area, the 2nd dorsal to the 2nd lumbar. The object of this treatment is to co-ordinate, or correct the correlation of the blood supply in the spinous muscles and the spinal cord. The necessity for this is seen when we consider that the spinal cord receives only one one-hundredth part of the blood supply of the body. By articulation we restore the normal functioning of the nerve centers, bringing back to normal the nerve supplies of the different organs and muscles. This is based on the fact that each muscle and organ is supplied with vaso-motor nerves from the spine through the blood vessels; that is, no organ or tissue is without its vaso-motor nerve supply and where there is a blood supply there is always a vaso-motor nerve supply. All the organs and tissues, therefore, have this fundamental connection that lies at the foundation of the nervous correlation. The stimulation of the spinal cord centers takes place primarily through the blood, the aeration or nonaeration of the blood representing the physiological stimulus. Remember that stimulus is here used in the wide sense of the term. It means either to increase or decrease (a) in the one case non-aerated blood acts as an irritant, exciting and irritating the normal function of the nerve, at the same time making the functioning of the nerve abnormal, (b) in the other case aerated blood, if in excess, acts as an inhibitor, because it produces congestion.