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Influencing the Vegetative Nervous System Through Manipulation*

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This paper has two purposes: To direct and stimulate interest in osteopathic manipulative therapy in treatment of imbalances of the vegetative nervous system; and to help the patient, dishonored throughout medical history, the so-called "neurotic." In our opinion, there is no true "neurotic"; a malingerer has an end to gain by "playing sick."

For the past 50 years the medical world has been undergoing a scientific revolution. We have all too gradually become aware of the fact that "there is a patient who has the disease as well as the disease which has the patient." Andrew Taylor Still was, perhaps, one of the most important of those who proclaimed this philosophy. The early osteopathic physicians accepted this principle and practiced accordingly. Their results and reputation gave osteopathy the place in the sun which it holds today. It would have been impossible to secure the legal right to practice osteopathy if a satisfied and enthusiastic clientele had not been behind our profession. Their confidence was gained and their enthusiasm stimulated because osteopathy had succeeded in thousands of cases where so-called specific drug measures had failed. We had succeeded because each of our patients was being treated as a single human biological unit, not as a localized pathological entity.

The "old guard" of the allopathic profession are reaching a place where they are forced to admit that perhaps we have contributed something in the management of articular mechanical problems, and some of our own men are perfectly willing to let it rest there. However, if medical history a hundred years from now records that as the main contribution of osteopathy, the osteopathic profession will have failed miserably. On the other hand, if we can study, practice and teach the effects of manipulative therapy on visceral function, and its ability to modify abnormal visceral physiology, then we will have contributed one of the greatest advances in science in many generations.

Manipulative therapeutic procedure can affect the function of remote visceral organs very largely—some

would say exclusively—through the vegetative nervous system. Let no one think that we are the only group interested in the importance of this factor. John F. Fulton, M.D., Sterling Professor of Physiology of Yale Medical College, writes: "Recognition of the part played by the autonomic nervous system in the regulations of body functions may be ranked as one of the greatest milestones of modern clinical medicine."

Our clinical results attest to the fact that correction of spinal mechanical abnormalities can alter abnormal visceral physiology. However, if we carefully analyze our results we know also that mere correction of all palpable spinal joint lesions is not always sufficient. In many cases where we expect results, the results are not forthcoming. It is our conclusion after much study and case analysis, that the fault lies in our failure to realize that spinal joint lesions sometimes may not be grossly palpable, and that if we study the condition from the point of disturbed vegetative function and trace autonomic reflexes back to their source, we obtain results from the mobilization of areas where, from the standpoint of palpation, gross lesion pathology does not seem to exist. The criticism may well be raised that perhaps the fault lies in a personal inability to diagnose spinal joint lesions by palpation. However, it has been our privilege to treat cases which have failed to improve under manipulative treatment by men who are far more experienced in lesion diagnosis than we; and yet when parts are treated where no trouble is apparent, but where, upon a reflex basis it should exist, improvement is often spectacular.

Nothing can take the place of thorough osteopathic manipulative treatment. Our aim is to treat the patient, not a given lesion. In our opinion correction of specific lesions in specific areas will afford great relief, but to obtain permanent results the entire body must be treated.

If this be true, and we admit that no treatment is without possible improvement, the point of attack and investigation should be what so long has been called "general osteopathic treatment." It is our birthright, and personally we believe that with it our profession will succeed or die!

A few years ago we were disturbed by the fact that apparently the same treatment to two different

*Most of the material in this article has been presented before the Academy of Applied Osteopathy in Chicago, 1944, the New Jersey State Osteopathic Association, the Essex County Osteopathic Society and the Osteopathic Society of the City of New York.

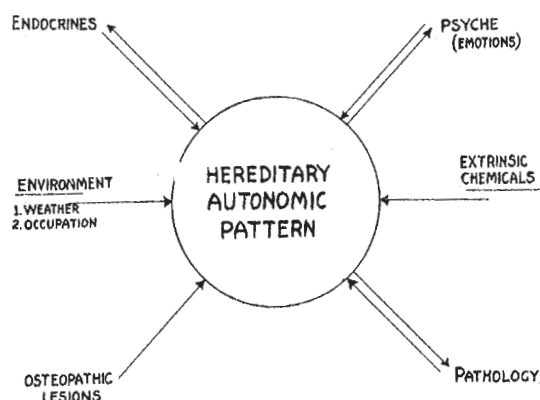


CHART I

individuals under similar conditions would have altogether different effects. Some were favorable and some were distinctly unfavorable. This led us into a study of relative balance and imbalance of the vegetative nervous system. The resulting thoughts we recently published.² At that time we presented a theory which we will restate now. It has been our conviction that true equilibrium between the sympathetic and the parasympathetic systems is a rare exception—not the rule. Further, we believe that a preponderance of one system over the other is an inheritable trait. Following this observation, we have found by careful study and examination that all individuals, whether sick or well, show a definite tendency toward exaggeration of either the parasympathetic or the sympathetic system. Superficially a patient may seem to be in a state of vegetative balance, but when carefully checked, he will be found to be very definitely *more susceptible* to stimulation or inhibition of one system than of the other.

The state of hereditary autonomic imbalance can and does exist without causing any noticeable symptoms, in our opinion, and increased experience seems to prove it. This slight imbalance or increased susceptibility to stimulation or inhibition exists in a symptomless zone as is shown on Chart 3. But an understanding of such a state explains many clinical problems such as the fact that some individuals rarely run high temperatures when suffering from infections, and others always run high fevers even from rather minor infectious conditions.

If a basic hereditary autonomic pattern can exist, let us study briefly some of the patterns and counter patterns which may theoretically occur. Much has been written about "autonomic imbalance." The consensus seems to be that there are states of vagotonia and sympathicotonia, but most instances of vegetative imbalance are included in the so-called "mixed type." Previously we³ have expressed doubt as to the existence of a truly mixed type. We believe that beneath the symptomatic or asymptomatic complexes of us all exists an hereditary autonomic pattern.

In Chart 1 we have attempted to explain why patients develop such a complexity of symptoms and why symptoms of the same clinical entity vary so greatly among different individuals, or in the same patient at different times.

Psyche.—In the upper corner we have listed the interplay of the psyche or emotions on the patient's nervous system. The works of Cannon⁴, Dunbar⁵, Cobb⁶, Alvarez⁷, Kennedy⁸, and many others, confirm this relation. It is also a fact that the physical, mental and vegetative balance determines the *type* of reaction the body gives to a given stimulus. Many diseases, particularly some of the endocrinopathies, change an individual psyche or emotional state. This may well produce one of the vicious cycles of disease, particularly of a neuropsychotic origin.

Endocrines.—Speaking of vicious cycles in disease, the neuro-endocrine balance and imbalance is typical. The interrelationship of the ductless glands and the vegetative nervous system is so close that many authors refer to it as the "neuro-endocrine" system. In fact they have been considered almost one system by such men as Zondeck⁹, and Pende¹⁰.

For example of the cyclic viciousness of a disordered neuro-endocrine system, let us look at various hyperthyroid states. A simple formula tells the story: *Hyperthyroidism*, — increased thyroxin, increased stimulation of the sympathetic nervous system, increased state of *hyperthyroidism*. The cycle begins and ends with hyperthyroidism.

More important, however, are the normal fluctuations of these two systems in maintaining what Cannon terms body "homeostasis"¹¹. Until imbalance occurs and passes from Fulton's¹² *fluctuating base* to a *fixed* imbalance, this homeostasis is not easily disturbed. It is equally true that when disturbed it is not always so easily normalized.

Environment.—The surroundings and actions of forces about man have much to do with his living and dying, his joy and sorrow. Only recently has the effect of weather (cosmic changes) on the workings of the nervous system and body function in general been studied extensively. It is through the sensory end-organs of the nervous system that these changes are perceived, so it is little wonder that this system should be the most vitally affected. Petersen has done much work on this subject. The hypothesis of the weather as a force of destiny in the lives of two great men, Lincoln and Douglas, makes interesting reading.¹³

Extrinsic Chemicals.—Looking at the other side of Chart 1, we would specifically include food and internal medication as extrinsic chemicals. The effects of drugs on the vegetative nervous system can be studied in any book on pharmacology; particularly good is Gilman and Goodman's classic "The Pharmacological Basis of Therapeutics."¹⁴

Most important in this consideration are not extrinsic chemicals from the standpoint of drug therapy, but rather the extrinsic chemicals in diet which we take into our bodies each day. A study of diet from the standpoint of basic fundamentals is really a study of the effect of mixtures of chemicals which are utilized in the maintenance of life.

Through food selection the biochemical balance of the body is being changed constantly. Biochemical balance has definite effects upon the vegetative nervous system, as well as upon the central nervous system. Such things as acid-base balance, sodium-potassium balance and potassium-calcium balance are too well known to call for discussion at this time. Thanks to a homeostatic mechanism, these balances are relatively stable and have an area of fluctuation which is compatible with good health.

Pathology.—More and more proof is being recorded that intrinsic tissue pathology markedly modifies the function of the central nervous system. This, we believe, is conversely true, that a definite vegetative pattern may in turn alter the symptomatology of a given disease. We believe that recognition of relatively minor deviations of vegetative balance is of great aid in both the diagnosis and the therapeutic management of any given disease. As one studies disease processes he is impressed by the fact that many diseases have two distinct classifications or types. It is further of interest to note that symptomatology of certain processes is manifest through one or both branches of the vegetative system. It is difficult to say whether the vegetative imbalance occurs first, preceding the tissue pathologic changes, or vice versa. Perhaps, we have another example of the vicious cycles in disease so that both may be true.

Osteopathic Lesions.—We have purposely left to the last the discussion of the effect of osteopathic lesions on the vegetative nervous system. Clinically we know that the therapeutic results of manipulative therapy applied to spinal regions can be produced through its effects on vegetative centers, and we believe that its success or failure depends upon this factor, and this factor alone. However, much confusion exists in osteopathic writings in attempts to describe treatment to these vegetative centers. We speak glibly of stimulating one region or inhibiting another. What do we mean by these terms? Some writers evidently mean the type of treatment given, while other writers seem to mean results of certain treatment given. Lack of standardization of terms leads to confusion and inconsistent results. In a recent article we stated that we believed that every osteopathic lesion which has existed more than approximately an hour has an inhibitory or fatiguing effect on the center involved by it.¹⁵ It is interesting to know that Louisa Burns¹⁶ states that steady deep pressure, or so-called "inhibition," produces the greatest effect on the joint surfaces themselves. She further states that the effects of the so-called "experimental" lesion, produced in animals in the laboratory, are usually the same as the effects of the steady pressure in these same areas. Remembering this fact alone aids greatly in localization of certain lesion areas where definite clinical syndromes exist. In our opinion, if osteopathic therapeutic results are to advance as they should, we must increase our efforts in research and study, to the end that we may devise a common language with which to express our thoughts clearly one to another. Until there is a clarification of the meaning of many terms in osteopathic literature, confusion will act as a millstone to the progress of manipulative therapeutics.

To maintain a relative vegetative balance in our patients we must understand basic principles in diagnosis and management of these autonomic states. In Chart 2 indicates the diagnostic and therapeutic intricacies of such a study. In the center symptom-free zone, marked in this illustration, is the so-called area of vegetative homeostasis in which the vegetative balance is constantly shifting to maintain body equilibrium. This shifting is physiological not pathological. If perfect, rigid, balance existed in man we would be in dire straits indeed; our environment would soon kill us. However, it has been interesting to note, during several years of clinical study, that this fluctuation of the vegetative system apparently tended to lean toward the sympathicotonic or the vagotonic side. This

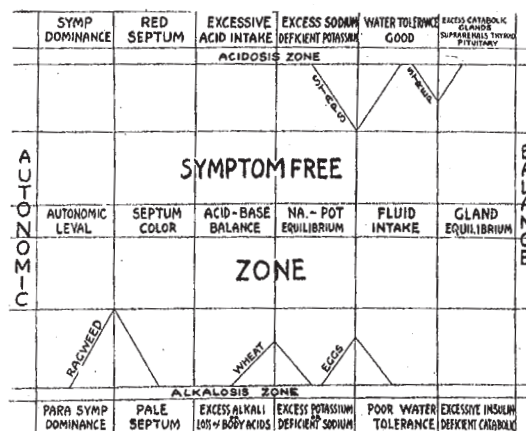


CHART II

apparently follows an hereditary pattern. The upper part of the diagram shows the result of sympathetic dominance. According to Jarvis^{17, 18, 19}, one of the prime diagnostic features of this state is consistently red septal covering of the cartilaginous portion of the nose. We suggest the reading of Jarvis' original articles to gain the full meaning and significance of this feature. The present article attempts nothing more than to rekindle the interest of the profession in the vegetative nervous system and its relation to spinal mechanics.

It has been noted by several authors that excessive intake of acid-forming foods tends to cause a domination of the sympathetic nervous system. This type of individual also tends toward a decrease in alkaline reserve, with a tendency for the sodium-potassium balance to be shifted in favor of sodium predominance. These persons show an extremely good water tolerance. Many authorities on hormone functions state that there is an excessive activity of the suprarenals, thyroid and pituitary glands in the sympathicotonic state. In general, the hyperactivity of these glands is reflected in the symptomatology of excessive sympathicotonic discharges. Blackmar,²⁰ from whose article this chart has been modified, thinks that minor changes in vegetative balance toward a sympathicotonic state predispose to staphylococcal infection. In fact, when we are trying to change the imbalance of individuals from the vagotonic to a more nearly normal and symptomless state, furunculosis is a sign that the patient is starting into an excessive sympathetic state. We believe that streptococcal infection is a more marked sign of pronounced vegetative imbalance toward the side of the so-called acidosis than is staphylococcal infection.

The vagotonic side of the picture is apparent. There is a tendency on the part of the pancreas to increased production of insulin in vagotonic imbalances. Much interest has been aroused recently by numerous articles on undiagnosed hypoglycemic states. It has been our experience, in about twenty of these cases, that each one could have been diagnosed had the state of his vegetative balance been considered. These patients tolerate carbohydrates very poorly because these food substances demand more and more insulin from the pancreas, which causes depletion of the functional capacity of that organ. We have under-

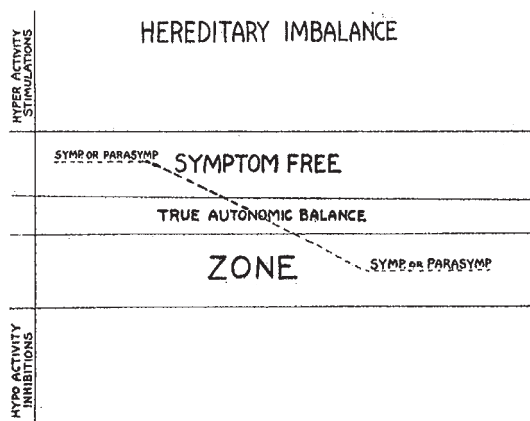


CHART III

taken more detailed study of this problem,²¹ and hope eventually to publish the results.

Perhaps it is well to discuss hereditary imbalance before studying various types of vegetative imbalance. In Chart 3 is illustrated diagrammatically our theory of hereditary vegetative imbalance, as discussed in our first article⁸ on the subject. In the symptom-free zone, vegetative reactions are constantly fluctuating. As previously stated, we believe each individual has a tendency to be more on either the sympathetic or the parasympathetic side of normal balance. We believe, that, through an *inherited nervous pattern* one or the other, or in rare instances, both, of these systems are more susceptible to stimuli than in the so-called rare "normal." Clinically, we have failed to see an individual who, on close examination, could not be found to have definite tendencies toward a true hereditary imbalance.

In Chart 4 is a diagrammatic representation of what we term a Type 1 vegetative imbalance. In this type is an excessive activity of one branch of the vegetative system over the other. This can be expected in such conditions as an acute spinal lesion which has existed, usually, less than one hour, or an acute infective process.

To treat Type 1 imbalance physiologically we must exert every effort to relieving the cause of irritation, or hyperactivation, of the sympathetic or parasympathetic branch of the nervous system.

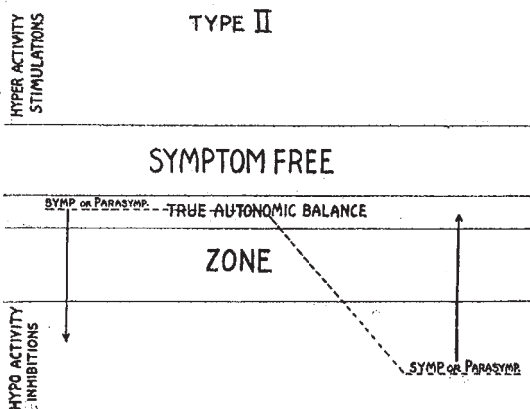


CHART V

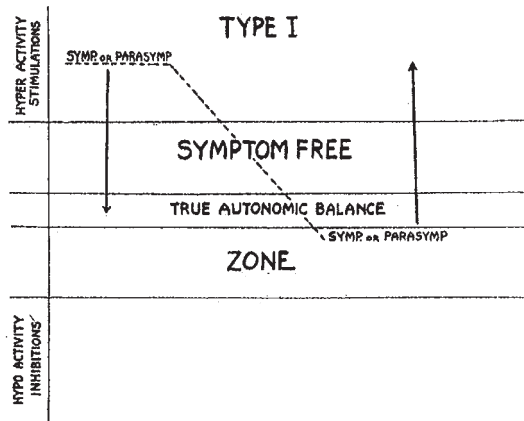


CHART IV

The Type 2 vegetative imbalance, Chart 5, is the end result of a Type 1 condition. After a certain system or branch of the vegetative nervous system has been stimulated a certain length of time that branch becomes fatigued. As a result of this fatigue, there occurs a *relative* preponderance of activity of the unfatigued portion of the vegetative system. Let us take, for example, a long-drawn-out febrile illness. Due to the constant fever of the infectious process, the sympathetic nervous system has been greatly fatigued. The patient tends to have a slow pulse, to run a subnormal temperature, with clinical signs of hypoadrenia and other neuroendocrine manifestations of sympathetic fatigue. Thus there is a relative preponderance of activity of the vagus with its resulting symptoms. It is our opinion that a Type 2 vegetative imbalance practically always follows the amount of involvement represented in Type 1.

Chart 6 is the diagrammatic representation of what we consider to be the most serious form of vegetative imbalance. The complex altered physiology which produces such a condition is too detailed for discussion at this time. Suffice it to say that where one branch of the vegetative system is overactive and, due to fatigue or some intrinsic disease of the nervous system, the other branch has been placed in a state of underactivity, the resulting imbalance is not only incompatible with good health but is extremely dangerous to life

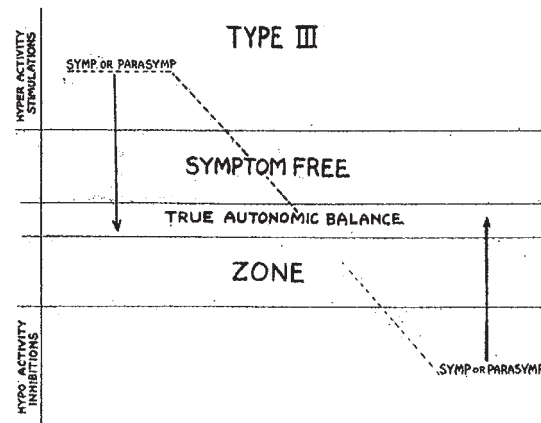


CHART VI

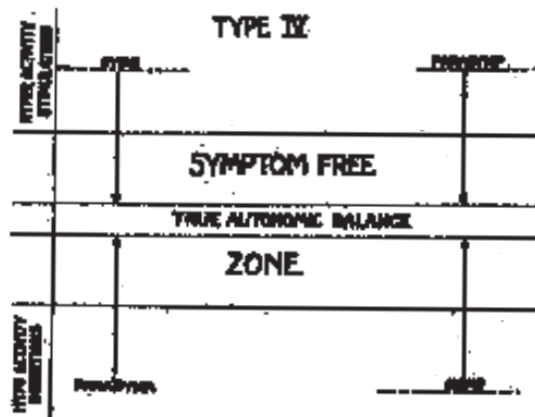


CHART VII

itself. We have several records demonstrating this type and the mortality rate is very high.

Chart 7 diagrams the fourth and last type of vegetative imbalance, diagnosis of which is difficult and in some stages impossible. These patients have had the entire vegetative system placed in such a state of hyperactivity that there is either a constantly changing picture of sympathetonic and vegetonic symptomatology or a complete lapse of definite symptoms despite the general malaise of the individual. This type of condition, in our experience, has been relatively uncommon despite the fact that many students have claimed it to be the most common type of autonomic imbalance.

In the discussion and diagrams every effort has been made to point toward a possible means of therapeutic control of imbalances. It is important that therapy be physiological rather than pathological. Further studies are under way to perfect osteopathic manipulative treatment for imbalances of the autonomic nervous system.

Before discussing the subject further, it may be well to point out another factor which comes to mind in the study of these diagrams. If we, as physicians, are attempting to normalize body function, we must determine how to re-establish the homeostasis of the vegetative system. Let us further examine Chart 4. Theoretically we should be able to establish a relative balance of the vegetative system in one or two ways. For example, if the vegetonic branch of the autonomic has been hyperactive, creating a relative depression or inactivation of the opposing sympathetic branch, we might establish a balance by stimulating the sympathetic system, thus producing a relative balance of two over-stimulated branches of the nervous system. In other words, we would create one abnormality to match another in an effort to produce physiological balance. Unfortunately, in the practice of drug medicine such methods are being and have been used. But this is not our idea of physiological normalization. Osteopathic physicians should never be guilty of creating an abnormality in an attempt to counterbalance an existing abnormal process. Recently the physiological truth of this statement has been proved in actual clinical medicine. Heath and Powdermaker¹¹ made a study of the so-called traumatic war neuroses and came to the conclusion that the symptoms indicated a sympathetic nervous preponderance. Also they arrived at the conclusion that there are two ways of attacking this problem:

Either to increase the action of the parasympathetic nervous system and therefore attempt to balance the overaction of the sympathetic, or to attempt to neutralize physiologically the action of the sympathetic hyperactivity. Experiments were carried out on a group of patients who were showing typical "battle reaction." Twenty patients were given 2 mgm. of doryl and three patients were given 250 mgm. of mechoyl, both drugs which stimulate the parasympathetic nervous system. In all of these cases the drug therapy was a complete failure. However, ergotamine tartrate was given to twenty patients who had been classified as having typical "battle reaction." The result was a complete subsidence of all symptoms for a period of 2 to 3 days, but the symptoms returned after the drug was discontinued. After a week's therapy the patients were improved and discharged. Ergotamine tartrate worked physiologically by depressing, and thus attempting to neutralize the hyperactivity of the sympathetic nervous system.

Probably the one system of the body which is most likely to be subjected to heavy stress and strain is the nervous system. This is particularly true during such times of nervous tension as we have been passing through. Any mass plan of rehabilitation which does not consider the importance of sympathetic treatment of abnormal psychology is far from complete. Nervous casualties on the home front are as important as those on the battle front, if not more so, because nervous strain experienced by those left behind is more insidious, more obscure from a diagnostic standpoint, than are the acute war neuroses. We must not dismiss these cases as "merely nerves." Instability of the nervous system can and does match the symptoms of almost any disease known to man. Recent research has proved that various nervous disorders, though mild in nature, are an important factor in accident production in war plants. One thing that the physicians in this country could do to prevent war accidents with resultant loss of man-hours, is to recognize mild disorders of the nervous system early.

Let us get out of the rut and give patients "harmless" sedatives. Most nervous disorders have a physical as well as a psychic background. We should use every method of clinical diagnosis to determine these physical causes of nervous unrest, then treat accordingly. The function of the mind and the function of the body cannot be separated; if emotional strain or shock upsets the normal patterns of nervous action and reaction, the result is abnormal function of body organs. In like manner, diseases and abnormal functioning of body organs can disturb nervous processes including activity of the mind.

Millions of persons have been labeled "neurotic" by members of the so-called healing professions because of two facts: We don't know what is wrong with them; and we don't know how to treat them. We also know that most other physicians are in the same state of ignorance, so we continue to tell people to go home and get hold of themselves. What nonsense!! If we are willing to take the time to study these cases we will find that there is an answer. Alvarez of Mayo's tells them "constitutionally inadequate," but we believe that they must be diagnosed more accurately than that to be treated effectively. They are victims of severe hereditary autonomic imbalance, wherein the results indicated in Chart 1 have driven the individual from the area of asymptomatic vegetative imbalance into the zone of symptoms.

The greatest conversion problem of the postwar world will not be the change-over of our industries to civilian production, but rather the metamorphosis of our population from the tension, glamour, excitement and war-infected mental activity to a state of quiet, peaceful, civilized living. This change will be made, but it will be made at a price. We believe, as previously stated, that man inherits a delicately adjusted nervous system, which will suffer after the battle letdown. We of the healing arts may well expect to manage many forms of unusual symptom complexes, and unless we are prepared to treat civilian and military postwar casualties, the results of damaged souls and nervous systems, we will be guilty of the greatest mass failure of medical history. And the worst error, by far, will be the all too frequent diagnosis of "neurotic." Too often a neurotic patient is a person who looks fine, feels terrible, and has been told by some doctor that there is nothing wrong except with the most important system of the entire body.

It has been stated that there are over ten million neurotic or undiagnosed invalids in the United States. This number will be greatly increased with the end of the war. Are we going to tell these millions of people to go home, that there is nothing wrong with them except their nerves? Again let me state: There is nothing wrong with them except with the most important system of their bodies.

These unfortunate people can be helped, we believe, if a few of the principles we have mentioned here are followed. If physicians will only try to understand the vegetative nervous systems of their patients, we shall be better physicians and they will be better and healthier citizens.

It is important that we help these people to understand their nervous systems, rather than to fight them. They must be taught to comprehend, not to fear. They must be given sympathetic understanding, courage and hope. They must be treated, not scorned. We believe that a majority of these cases can be successfully cared for if the bulk of the treatment is aimed at stabilizing unstable nervous systems.

The fate of millions of undiagnosed nervous cripples lies in our hands and in our minds. Will we justify their hopes, or confirm their fears?

SUMMARY

Important in treatment of involvements of the nervous system are:

Careful, exhaustive diagnosis;

Manipulative treatment carefully and scientifically applied;

Correction of endocrine disabilities;

Elimination of co-existing disease, as much as possible;

Maintenance of proper food intake and elimination; and

Intelligent psychological approach to the patient.

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