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Psychosomatic Disease and the Law

*Carl E. Wasmuth, M. D.**

THERE ARE FUNDAMENTAL DIFFERENCES between the standard of probabilities in law upon which a jury must deliberate, and the standard of certainty in the scientific laboratory of medicine which an investigator must respect. It is frequently stated that no common grounds exist upon which a mutual understanding or agreement of these fundamental variations can be reached.

This conflict often is the result of a lack of mutual understanding and respect of the basic ground rules of both professions. The physician resents the lawyer's obviously scanty knowledge of things medical and his attempt to refute competent medical testimony by legal maneuvering. The attorney deplors the hesitancy of the physician to depart from the principles of the scientific laboratory and his adamant refusal to accept the legal definitions and principles of causation and measures of damages in their application to the case in law.

This conflict is nowhere more evident than in the field of psychosomatic disease. This area of medicine has long been recognized but it was only in recent years that it has become the target for intense research. This lack of medical interest in what was considered a fringe area has caused the legal profession to substitute law for medicine. Eventually, however, science will progress in the field of psychosomatic medicine to the point where the lawyer will have accurate, objective tests available to show causation and to evaluate the extent of damages.

Very early in his academic career, every law student briefs the case of *Lynch v. Knight*, where Lord Wensleydale stated: "Mental pain and anxiety the law cannot value, and does not pretend to redress, when the unlawful act complained of causes that alone." By this statement the English court simply ruled that pain and suffering were difficult to prove, and that it was present it was impossible to assess by other than subjective tests, and that unless there was physical injury, damages for mental pain

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[ILLUSTRATIONS are at the end of this article.]

and suffering would not be allowed. The court thereby took legal cognizance of the lack of scientific objective tests for evaluation of mental pain and suffering. The plaintiff in many deserving cases was denied damages for mental and emotional trauma because of lack of scientific corroboration.

A still larger and vastly more complex field involves the causation and extent of injury resulting from psychic trauma. Medical testimony here frequently must be based on medical judgment. Hard scientific evidence often is impossible to find or, if found, is impossible to apply. Inasmuch as the docket of most courts today is overwhelmingly laden with personal injury cases, the extent of damages for the immediate injury and its sequelae looms ever greater. Determination of causation of disability and pain and suffering resulting from precipitation of disease or aggravation of pre-existing disease is a most perplexing problem. Elsewhere in this issue of this Law Review an article [*Relation of Trauma, Disease and Law—A Symposium*] points up this problem with great clarity. Suffice it to say that today physicians are taking medical note of a fact which the lawyers recognized many years ago—that the body is a whole, and that injuries of one part may affect the entire organism. Our brethren in the law have for many decades been seeking redress for mental pain and suffering in tort actions. Inasmuch as they had no objective tests with which to verify psychic trauma, damages were frequently denied.

In recent years, however, medicine has taken a greater interest in this field of mental pain and suffering. It is recognized today as a distinct clinical entity and is known under a variety of terms such as stress reaction, psychoneurosis, postconcussional syndrome, and many other terms relating to the specific disorders of individual parts or organs of the body. All of these various names and subdivisions can be grouped together under the general term, psychosomatic disease. As the name points out, this specialty of medicine deals with the interreaction of the brain and the central nervous system with the soma or the remaining part of the body; not included are the purely psychiatric conditions such as the psychoses.

Physicians have known for many centuries that the emotions play a predominant role in disease. However, with the specialization in medicine, many have lost sight of the body as a whole and tend to separate the psyche from the soma. The country doctor

and the general practitioner of medicine recognize only too well that injury to the body is reflected immediately in the central nervous system and that both require treatment. In fact, many times the psyche is in far greater need of therapy than is the diseased body. Many describe the complaints related to the emotions as functional; some state "it's in your head." No matter by what label it is tagged in medical nomenclature or practice, the patient is no less sick and in need of treatment. However, it took the laboratory scientist and the specialist to reduce the empirical claims of the general practitioner to concrete medical facts.

Psychosomatic disease also includes that great mass of conditions of patients whom the internist treats for chronic illnesses. It is upon these patients with chronic disease that the psychic element of trauma may have devastating influence. They already are suffering from disturbances in their emotional lives. The illness may be wholly or partly of psychological origin, and can be satisfactorily studied and treated only if this factor is adequately appreciated. It matters not whether the emotional factors are initiated by a diseased organ or by the trauma of an automobile accident. If the personality is sensitive enough, a comparatively minor episode may be the precipitating factor for a psychoneurotic or psychosomatic illness. Among individuals, the sensitivity of the central nervous system to this type of illness varies as greatly as does the susceptibility of the soma to infection. To understand the modus operandi completely, it is necessary to review some of the anatomy of the nervous system and its control of the body.

Anatomy of Central Nervous System

The central nervous system has two major divisions: (1) the somatic nervous system, and (2) the autonomic nervous system. The former primarily is the source of our intellect, our five senses, and our control of the voluntary, skeletal muscles of the body. It consists essentially of the brain, spinal cord, and peripheral nerves. The most significant item, however, is its conscious control of the voluntary motions of the body. The cortex or outer layer of the brain is the center of higher intellect. Most highly developed in man, it controls every conscious movement of the body. It receives pain, touch, and temperature sensations from the distal limb over the sensory (afferent) nerves and registers them in the higher centers. The brain then interprets these sen-

sations and causes a reaction over the motor (or efferent) nerves. Sight, taste, smell, and hearing are mediated over the cranial nerves.

This discussion is mostly concerned with the autonomic nervous system, sometimes referred to as the vegetative nervous system. In contrast to the somatic (or peripheral) nervous system, this system controls the internal organs of the body, the blood vessels, sweat glands, pupils of the eye, secretory glands, some endocrine glands, reproductive organs and sphincters of the rectum and bladder. At a glance, it becomes evident that we seldom are conscious of the sensations of these organs and that we have little or no conscious control over them. This, in brief, is the autonomic nervous system—a complex control mechanism which is constantly directing and influencing the functions of the body such as digestion, breathing, circulation, excretion and sexual activities.

Upon closer examination, however, we find that physiologically this system actually is divided into two components, the function of one being counteracted by that of the other. The sympathetic nervous system and parasympathetic nervous system together comprise the autonomic nervous system. As a general statement, where the sympathetics stimulate an action, the parasympathetics inhibit the same action; and vice versa. Where the sympathetics relax, the parasympathetics close a sphincter. This opposing action, however, is finely balanced. In the state of inactivity, on normal rest, both systems exert simultaneous influences over muscles, resulting in normal muscle or sphincter tone. When that organ, sphincter or muscle is needed for a specific body function, by precise control the one system is inhibited and the other system stimulated and the function is effected: the stomach begins digesting, the bladder is emptied, or the uterus contracts to deliver the baby.

This central control of the autonomic nervous system is located in the midbrain, close to the pituitary gland. This part of the brain is, phylogenetically speaking, a rather primitive extension of the brain stem. It is said to house, among other things, the emotions, such as fear, rage, disgust, and sorrow.

After due consideration, one realizes that the emotions too are to some extent involuntary. Who can control fear when an automobile is approaching at high speed in his lane of traffic? Who can completely control sorrow when his mother or father

or wife or child is dying? These basic emotions have been present in the midbrain through many thousand generations of man. They are, for the most part, involuntary actions, but in varying degrees in man they are subject to the control of the cerebrum or cortex of the brain. Some people cry at sad movies, some laugh easily at poor jokes. Some people are antagonistic, some are congenial. For the most part these are manifestations of mid-brain function and are seated very close to the nuclei which govern and control the autonomic nervous system. Perhaps we all remember the child who laughed so hard that she wet her pants, the man who was so angered that he got indigestion, or the woman who was so frightened that her heart seemed about to jump out of her chest. The seat of these emotions is so closely related to the seat of the autonomic control mechanism in the midbrain that the one is frequently affected by the other.

Their results are the menstruating woman whom Stewart calls a "witch," the man with an ulcer burning in his stomach who becomes a bear, and the baby crying with the colic all night who brings many otherwise happy marriages to the brink of divorce. So interwoven are these nervous systems with the mid-brain and the emotions, that the effects of one can never be separated from those of the other. An injury or illness to one part of the body might easily send these sensory impulses to the mid-brain. At this point, the emotions might be affected and/or the autonomic nervous system stimulated in some manner. It may easily be seen that a severe fright can be manifested in emotional change and also in indigestion, or in involuntary urination. Perhaps such a fright may also cause a quiescent stomach ulcer to rupture or bleed or a dormant spastic colon to be activated. Is the fright the proximate cause?

One can now begin to understand the over-all effect of injury to the body and transmission of the pain sensation to the midbrain. Emotional effects are dramatic and, if sustained, establish a pattern that may affect the rest of the body (soma) through the autonomic nervous system. The question now becomes: When does a normal physiologic reflex become abnormal or pathological?

The sympathetic nervous system originates in nuclei of the midbrain. The nerves run in the spinal cord and emerge along the nerve roots that are given off at each vertebra. Most of the sympathetic nerves are distributed to the internal organs of the chest, abdomen, and pelvis. Others ride along the blood

vessels to the limbs and brain. The latter nerves supply the vessel walls and sweat glands. In the chest, the sympathetics supply nervous control to the lungs and heart. In the abdomen, the sympathetics supply all the organs of digestion, the kidneys and blood vessels. In the pelvis, the sympathetics supply the reproductive organs and sphincters of the bladder and rectum. Stimulation of this nervous system, therefore, can cause effects manifested throughout the body.

The origin of the parasympathetic nervous system is more complicated. The principal and largest part of this system is the vagus nerve (X cranial nerve). This nerve originates in the brain, emerges from the skull, and travels down the neck, giving off numerous branches. When it enters the chest, branches are distributed to the heart and lungs. When it pierces the diaphragm and enters the abdomen, the right and left vagus nerves coalesce in the celiac ganglion. From here its numerous branches supply the organs of digestion and the kidneys. In the pelvis, the parasympathetics originate not from the vagus nerves but from the spinal cord. They supply the reproductive organs, the bladder, and the rectum. Stimulation of this parasympathetic nervous system affects any or all of these organs.

The midbrain, however, is not the true controlling part of the central nervous system. In order that the thalamic (mid-brain) reflexes, such as fear and rage, do not go uncontrolled, civilized man has built-in in the brain, a supreme governor. This structure (which we have discussed) is the cortex of the brain. Developed to its highest degree in the human, the cerebrum is the center of all intellect. It governs what we think, what we do, and how, when and why we do it. It is the high court of the nervous system and it sits in both law and equity. By its consummate action, each of us is an individual with his own characteristics and behavior patterns. We are not just thalamic animals exhibiting rage, fear, or sorrow, but individuals who by reason of the cortex react, modify, and obtain the basic emotions by way of cortical inhibition. Some of us are refined, gracious, and meek. Others are dynamic, vulgar, and ambitious. Each has an anatomically identical midbrain, but the inhibitions of it, controlled by the cortex, determine the personality. It is little wonder that Lord Wensleydale threw in the legal sponge and stated: "Mental pain and anxiety the law cannot value and does not pretend to redress, when the unlawful act complained of causes that alone."

A few cases of wet pants, pounding hearts and indigestion

are certainly not sufficient cause for damages in court. Fortunately from the physical view, and unfortunately from the legal, these changes while dramatic are not prolonged nor permanent. However, if these changes are present for any length of time, so that a normal physiologic reflex becomes a pathologic or abnormal state, we have a disease or possibly a legally compensable condition.

Let us consider in very general terms the condition known in medicine as the "American Disease." Most Americans live under conditions which are more or less stressful. Young men and women, full of ambition and the desire to progress in the business world, take on the added burdens of attending night law school. In addition to their usual family responsibilities, social obligations and classroom attendance, they spend a great number of hours in study and preparation for examinations. Sooner or later, such stress begins to show. At least in the older groups, it would be interesting to know how many have headaches (migraine), stiff necks, urinary or digestive disturbances, irregularities of the heart, and emotional or personality changes result from this stress. These same studies have been made many times in the business world. As a result of them many large corporations require their key personnel to have routine medical examinations, vacations and daily rest periods. Comfortable and pleasant dining rooms are supplied, and the employees are expected to take adequate lunch periods. By these prophylactic measures, industry has found that it can keep the American Disease to a minimum. The reaction of the midbrain to the stress of business worries and obligations is thereby reduced. The autonomic nervous system during rest is given respite from the incessant stimulation of the emotional upheavals. The coronary arteries of the heart are permitted to relax; the increased and deranged motility and excessive secretion of acid in the stomach return to normal; the spastic gut relaxes; and the pain and distress of menstruation may be relieved.

The effects of stress are the result of the press of circumstances and environment upon the emotions, midbrain and autonomic nervous system. The effects of stress might be from an injury, from mental strain (pain and suffering) of any cause, from disease process, or from suggestion. The effects of stress are manifested in any number of ways or combinations. The effects may be seen in the emotions, as in any organ innervated by the autonomic nervous system. The effects therefore may be in the lungs (asthma and "allergic conditions"); in the heart

(coronary artery disease, angina pectoris, other irregularities); in the stomach (gastritis, peptic ulcer, gas, bleedings, butterflies); in the gall bladder (biliary colic, stones); in the gut (colitis, irritable colon, mucous colitis, regional ileitis, proctitis); in the excretory organs (Hunner's ulcer, bladder, constipation, proctalgia fugax, itching anus); in the generative organs (frigidity, menstrual irregularities and discomforts); in the head (insomnia, faintness, epilepsy, stroke, migraine, stiff neck). Stress, in the medical sense, therefore, is any stimulus or succession of stimuli of such magnitude as to tend to disrupt the homeostasis of the organism. When the mechanisms of adjustment fail or become disproportionate or incoordinate, the stress may be considered an injury, resulting in disease, disability or death.

The reaction to stress, however, cannot just be fleeting (as in fright) to produce a permanent pathologic condition. If this were so, most of mankind would be a mass of disease processes. Sustained bombardment of nervous stimuli are required for such abnormal changes. Such changes are not infrequently due to dysfunction in the endocrine system of the body. This is a system of so-called ductless glands. They are known as ductless glands because they empty their secretions into the circulatory system. For the sake of simplicity it might be said: the pituitary gland is the master control gland. It is attached to the base of the midbrain by a stalk, is closely associated with the ganglia of the autonomic nervous system, and is interlocked with the autonomic nervous system functionally. The pituitary gland has many specific secretions which affect all the other endocrine glands. The anterior portion secretes substances which stimulate the thyroid, parathyroid, pancreas, breasts, adrenals and gonads. Lack of these substances might cause a diminished activity of these organs. The posterior part of the pituitary is said to start the uterus contracting at the end of pregnancy causing the delivery of the baby.

The thyroid gland in the neck controls the metabolic rate of the body. In other words it regulates the fire in the furnace of the body. The pancreas regulates the amount of sugar available to be burned in the furnace. The adrenal glands are the glands of stress. Increased amounts of epinephrine are secreted into the blood stream when it appears that the fire in the furnace is likely to be extinguished. If the threat remains too long, cortisone from the adrenals bring up the reserves for the long haul.

It becomes evident that the human body is a complex mechanism with a highly integrated system of defense for self-preservation homeostasis. The interactions between the several nervous systems and endocrine glands are a series of checks and balances. When in perfect running order, the happy, healthy human results. When disarranged, the human becomes a functionally and/or organically diseased wreck. The mechanisms initiating such disarrangement vary from infectious and metabolic diseases to mechanical injury. The body reacts to all in a like manner. The principal aim of this control mechanism is homeostasis or a normally functioning system. Any disease or injury initiates one of the compensating homeostatic mechanisms so that the body returns to normal.

Examples of Psychosomatic Disease

A review of a few of the most common psychosomatic diseases will illustrate these many pages of introduction. As a case illustrates a particular point of law, so in medicine the case illustrates the particular disease.

Stomach

Peptic or gastric ulcer is one of the most common stress or psychosomatic diseases. Most of us are familiar with the antacids available without prescription at the drugstore. The dyspeptic executive worships at the shrine of these proprietaries. He knows that when the going gets tough and the belly is burning, "antacids" give temporary relief. But he may learn, as many have, that in long-continued stress, relief by these agents becomes less and less effective. He soon becomes aware of more serious symptoms. He might vomit blood or experience excruciating abdominal pain. Now, the simple stress symptoms of burning becomes bleeding—a functional discomfort has become an organic disease. Instead of simple increased acidity, the stomach is now ulcerated. The complicated homeostatic mechanism has worked so well that a pathologic disease resulted!

Of all the psychosomatic diseases, gastric ulcer is best documented because the stomach is so easily studied. Most doctors are familiar with Beaumont's studies of Alexis St. Martin, an Indian who had a gunshot wound of the abdomen. A fistula (opening) formed whereby the stomach could be watched through a hole in the abdomen. Through this portal, Beaumont first watched digestion in the human stomach and his findings were the basis of gastric physiology for decades.

More recently, however, Wolf and Wolff studied gastric functions in a fiery, ill-tempered Irishman named Tom. Tom, when a young boy, stole a swallow of what he thought to be beer. The "beer," however, turned out to be very hot clam chowder. When he swallowed it, the clam chowder burned his esophagus and the boy was no longer able to swallow food or liquid. An artificial opening from the skin of the abdomen into the stomach was made. A gastrostomy was necessary for feeding. Food then could be introduced directly into the stomach. The study of Tom's stomach during emotional storms is the basis of much of our gastric physiology today.

When Tom thought of delicious, appetizing food, the walls of the stomach became redder and the gastric juices were secreted. Sudden fear, however, caused the walls of the stomach to blanch and secretion of gastric juices to stop. This is the emotion of flight and fear. Sadness and other such feelings also were found to be marked by a depression of these gastric functions. However, increased function of the stomach was produced by the emotions involving conflict, hostility, resentment, and anxiety. Wolf and Wolff in their book, *Gastric Changes Accompanying Emotion*, state "Profound alterations in gastric function as well as in other bodily patterns were found to accompany emotional disturbance. The alterations in gastric function fall into two categories: (1) depression of acid output, motor activity and vascularity, and (2) acceleration of these functions. The former was associated with a reaction of flight or withdrawal from an emotionally charged situation. The latter accompanied a reaction of internal conflict, with an unfulfilled desire for aggression and fighting back. Profound and prolonged emotional disturbances of this kind were accompanied by marked and prolonged increases in gastric motility, secretion, and vascularity with reddening and engorgement of the mucous membrane, often reproducing the picture of gastritis.

Accelerated acid production and motor activity are always accompanied by engorgement of blood vessels of the lining of the stomach. When engorgement is prolonged, the walls become intensely red, thick and turgid, presenting the picture of what has been called "hypertrophic gastritis." In this state the mucosa is unusually fragile, bleeds easily, and small erosions result from minor injuries. Lowering of the pain threshold occurs and symptoms are often associated with this condition. Thus the difference between hyperfunction in the stomach and hypertrophic gastritis is seen to be mainly one of degree. Con-

tinued exposure to the digestive action of gastric juice for four days results in peptic ulcer. Thus in long-continued periods of stress, normal stomach reflexes can become pathologic with the production of diseased states. The continued reaching for an "antacid" to relieve the acid indigestion has become a habit, but the results of such medication are diminishing. The pain persists in spite of therapy. A fleeting case of indigestion has progressed through hypertrophic gastritis to gastric ulceration. A true pathologic condition has resulted from emotional stress or wear and tear. This is known as the "American Disease" and constitutes a major portion of every physician's practice.

Menses

One of the more common manifestations of stress in women is the affection of the menses. Stress may be manifested in any one or combination of the following: amenorrhea—cessation of the menses; irregular menstruation; menorrhagia—excessive flow; or dysmenorrhea—pain during periods. The latter condition has been the subject of a great amount of writing both in this Law Review and in many medical journals. Authors have attempted to classify dysmenorrhea according to cause. The simplest classification is that by Wittkower and Cleghorn. The first group is constituted by those women to whom the onset of the flow constitutes the signal for a hysterical reaction. These women exaggerate all the feelings that every normal woman experiences during a menstrual period. It is the typical hysterical reaction of weakness, collapse, indescribable pain, amnesia, etc. The reaction may be massive enough to interrupt normal life for a period of a day or two.

Other women may have dysmenorrhea as a result of or as a reaction to stress. Usually the abnormal periods begin after the woman has experienced an emotional bout or has suffered feelings of insecurity. The patient usually is anxious or depressed, and the pain becomes severe. The flow may also be accompanied by other distressing conditions, such as flooding or nausea and vomiting. Frequently, one of the most invaliding symptoms is the migraine-type headache. This distressing combination of conditions may be so overwhelming as to cause the woman to be prostrate for one or more days.

If these symptoms are present when her menstrual cycle starts (menarche), the girl usually has lived in a setting of insecurity or family strife.

The second classic group of dysmenorrhea is found in the

Atalanta syndrome.* Dysmenorrhea is one of the Atalanta symptoms and some of the most severe forms of dysmenorrhea are met within women whose overt behavior and mental content show that they are repudiating the female role.

Dysmenorrhea occurs in two different types of personalities. One group is distinguished by resentment of the female role. The women are hard and aggressive in expression, with unfeminine voices and masculine carriage. As children they were tomboys, fond of rough games and often outstanding at school. They usually are resentful of menses. They like to remain sisters to their men friends, and in feminine fields display a hard emotional inaccessibility, which often covers a rebellion against their own nature.

The other main group have small juvenile faces and fragile physiques. They are shy and timid, menstruation to them is an affront to their high standards of fitness and personal cleanliness.

Heart

Many symptoms of the emotional states are manifested in changes in the circulatory system. In fright, the heart skips a beat or pounds in the chest. Others describe the heart as racing or as "in their mouths." So definite and striking are these phrases and descriptions that the syndrome is recognized by almost everyone. The question then arises: "Can this reaction in a diseased heart produce permanent damage?"

The heart in the human is not only a complex pump mechanism but its nervous control is still not fully understood. However, the heart works with great efficiency and has a great amount of reserve. If normal at birth, the reserve steadily declines throughout life until it reaches the stage where the requirements for life demands the full cardiac output.

Stress reactions cause a quickening of the pulse, increased cardiac output and increased blood pressure. These are the heart's methods of meeting the requirements of the emergency. When the person is alarmed, the homeostatic mechanism com-

* Atalanta, a heroine, beautiful and fleet of foot. In Boetian legend she challenges her suitors to a race, death being the penalty of defeat, and her hand the prize of victory. Hippomenes defeats her, dropping on the course three golden apples, given to him by Aphrodite, which Atalanta stoops to pick up.

Atalanta symptoms are: frigidity, dyspareunia, dysmenorrhea, irregular menstruation, amenorrhea, menorrhagic abortion or miscarriage, vomiting in pregnancy, difficult labor, minor illness or depression and failure of lactation in puerperium.

pensates to protect the whole body. Cannon contended that additional epinephrine is secreted. The blood vessels in the brain and coronary vessels of the heart dilate. This provides an increased amount of blood to the brain and heart. Many other vessels contract in order to economize in the areas where increased energy is not needed.

Whenever the body reacts to these situations, there is an increased strain on the heart and vessels of the body. The heart's work now increases many times. It must not only pump a greater amount of blood through the circulatory system but it must pump it at greater pressures and against greater peripheral resistance. The normal heart can cope with these situations with great ease. However, the aging heart may show signs of infirmity. The coronary vessels may be sclerosed sufficiently so that the increased work load may be too great. In such a case, the oxygen being delivered to the heart muscle by the blood pumped through the coronary arteries may be insufficient. The heart muscle will then react violently with pain and irregularity. If continued, of course, this will result in myocardial ischemia and possibly in cardiac standstill.

These conditions have been thoroughly studied in countless investigations. The physician today has innumerable diagnostic machines to determine the state of the myocardium. In fact, today, much investigation is taking place in the treatment of these cardiac diseases.

The important fact remains that everyone has a diminishing cardiac reserve. The vessels of the heart are constantly becoming less elastic and more sclerotic. This process progresses at different rates in various individuals. Some aged persons have relatively young coronary vessels. We all have had friends who died of coronary vascular disease at relatively young ages. In these, the aging process or hardening process progressed out of all proportion to the chronologic age. One can readily understand that increased pressure, worry, or anxiety might readily produce a strain on this individual's heart out of all proportion to that in another his own age. Perhaps this is the reason why physicians and lawyers die young and why industry carries huge amounts of life insurance on its executives.

Conclusion

Psychosomatic medicine, like equity, cuts across the whole of medicine. It deals with the relation of the psyche to the soma. To understand the field, one must comprehend at least the funda-

mentals of all the rest of the body. No organ or system is exempt. In this article, the three specific discussions serve to illustrate psychosomatic disease in three different areas of the body. There are countless other psychosomatic diseases. It can readily be seen that emotional drive or stress can exert somatic responses which are physiologic. If of great intensity or prolonged, the reaction in the body becomes pathologic and a disease process results. When such a state is reached, removal of the stress may not be sufficient. The disease process already is present. If it does not regress spontaneously, other therapeutic measures may be indicated.

The whole sequence of events has been precipitated by an organic injury or mental stress. These stimuli cause the reactions carried through the autonomic nervous system. Each individual responds in his own particular manner. Some of us have severe diarrhea from stimulation of the small gut, when worried. If continued, the horrible disease of regional enteritis may ensue. Others get migraine headaches. Although uncomfortable and perhaps incapacitating, serious sequelae are not known. The more fortunate person gets some simple, not incapacitating condition, such as proctalgia fugax. This condition is manifested as a spasmodic pain in the rectum. These persons and the dysmenorrhic woman can count themselves among the fortunate when they compare their inconsequential infirmity with some of the serious and frequently fatal psychosomatic diseases, such as ileitis, gastric ulcer, and coronary artery disease.

* In a summarizing paper before the Association of American Physicians, Wolff gave this remarkable epitome: "Interference with or threat to his life or love, or blocking the proper fulfillment of an individual's potential, causes him to react as though to assault. He responds defensively or offensively, or both, depending on his nature, his past experience, and the situation. Under these circumstances he struggles to regain what has been lost and to rid himself of interference, in order to fulfill his drives. Such struggles evoke what may be called emergency or crisis protective patterns.

"A considerable part of the human equipment has to do with meeting emergencies and dealing with crises. Protective reactions are set off by threats usually in the form of symbols, which have been connected with danger in the past.

"Some of these reactions represent widespread mobilization to provide extra fuel and energy for vital parts of the organism. Others appear to be focused on regional defenses, notably at portals of entry and exit. Offensive and defensive, general and local protective devices may operate together and separately.

"Along with these conspicuous bodily preparations go certain feelings and attitudes which, stemming from the same needs, have the same goals.

"The organism sacrifices at such times some functions or capacities for the sake of promoting others that are most important to meet the adverse situation. Although there is a degree of specialization in the sense that one

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or another protective arrangement is dominant, discrimination is not exact. In a threatened man it is common to find a variety of protective reactions, some of which are extremely pertinent, others less so, and still others minimally effective.

"Because his drives are primitive and even violent, they may be out of keeping with a man's conception of himself and therefore unacceptable. Thus, the drive denied or not fully recognized by the subject, the subsequently evoked protective reaction patterns may unwittingly become sustained. A few of these reaction patterns have been intensively studied.

"During assaults or threats arousing conflict, with anger and a pattern of offense, the stomach prepares itself for eating with increased blood flow, acid secretion and motility. The gastric mucosa may become turgescient and the blood vessels friable. With forceful gastric contractions, bleeding readily ensues and erosions of the mucous membrane may follow.

"In reactions to assaults, threats, or symbols arousing conflicts changes with resentment and hostility a protective pattern of defense involving the large bowel may precipitate a disastrous chain of events. The colonic mucosa may become engorged, turgid, and myriads of petechial hemorrhages ensue. With violent contractions increased concentrations of mycolytic enzymes and increased fragility of the mucous membrane, this membrane may erode and ominous hemorrhage ensue.

"Conspicuous among defensive protective reactions are those involving the nose and airways. It has been observed that in reaction to assault, certain individuals occlude their air passages and limit the ventilatory exchange by vasodilation, turgescence, hypersecretion, and smooth and skeletal muscle contractions. The changes, especially in the upper respiratory airways give rise to a variety of symptoms, notably pain and obstruction, the latter often leading to secondary infections and the prolongation of morbid processes. Also, a non-participation behavior pattern and attitude is exhibited in interpersonal relations.

"Offensive protective reactions involving chiefly the cardiovascular and renal systems were exhibited in certain aggressive individuals. These persons, in reaction to assault, mobilized their equipment, causing the work of the heart to be greatly increased through increased rate, output and peripheral resistance. Especially notable in those with pressor reactions and essential hypertension was a significant reduction in renal flow during periods of experimentally induced assault, an effect with potentially ominous implications.

"It is suggested that when the individual maintains such emergency measures symptoms and tissue damage may follow.

"In brief, man, feeling threatened, may use for long-term purposes, devices designed for short-term needs. Costly protective activities are essential and life-saving. They are devised for fleeting emergencies so that he may destroy those forces that threaten his survival. But, they are not designed to be used as life-long patterns and when so utilized, may damage structures they were devised to protect.

"These considerations constitute the basis of a good deal of human suffering and sickness. To prevent these disorders more knowledge concerning the origin of these patterns in childhood is necessary. To interrupt them once they have become well established requires a vigorous and fresh approach. To deal with these disturbances it is necessary to study the functions of organs widely separated in the body, and because the methods require cutting across the lines which usually separate the various medical skills, the horizon of the physician must be broadened. It follows that interest in these illnesses cannot be limited by delineations of a new specialty of medicine. The pursuit of these matters is a prime medical responsibility of our day."

Wolff, Harold: *Emotional and Clinical Medicine*. Cobb W. W. Norton & Company, New York, 1950.

Causation of the many psychosomatic diseases has been generally established and accepted in medicine today. However, the yardstick for measuring such cause and effect for any one complex has not yet been developed. As stated many times, medicine is not an exact science. It does not progress as a given formula of reaction in chemistry or a given sequence in the field of physics. Instead the human is a complex set of interacting systems, more or less under the central control of the brain but modified in some situations by autonomy of the individual organs or glands. The personality of each human is unique. Therefore, any given external stimuli will not cause the same reaction in any of us. However, the general pattern of stress has been described and accepted by most medical authorities. The acute period of stress calls into play emergency reflexes to protect the body in these stressed conditions. If, however, this emergency of stress persists, the body may not have capacity to withstand these pressures. At this point, a normal protective reflex becomes an abnormal pathologic disease. There are numerous cases in tort law where damages are not allowed for mental pain and suffering when no contact is proved. Yet, by the above series, it is clearly shown and accepted that an organic reaction to an emotional problem is one of the most common diseases in the practice of medicine.

The problem of proof is difficult. In this field, medicine lags. As yet there are no specific laboratory tests. Probably the closest yet has been the stress lymphocyte and the eosinopenia of stress (Wasmuth). However, these lack specificity and certainly cannot be held as quantitative examinations. The problem then resolves itself around one statement acceptable to both professions: Stress diseases are clinical entities, the cause is known but the measuring sticks not yet adequate. Causation can be proved by the existence of the disease as detected by innumerable diagnostic aids. To assess the extent of damages accurately becomes a problem to be solved in the medical laboratory. But in the meantime, the law must accept the causation.

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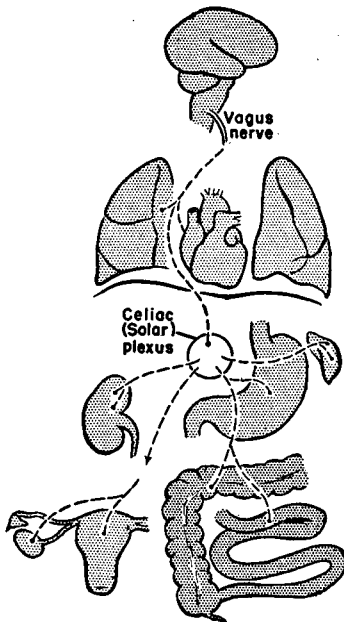


Fig. 1

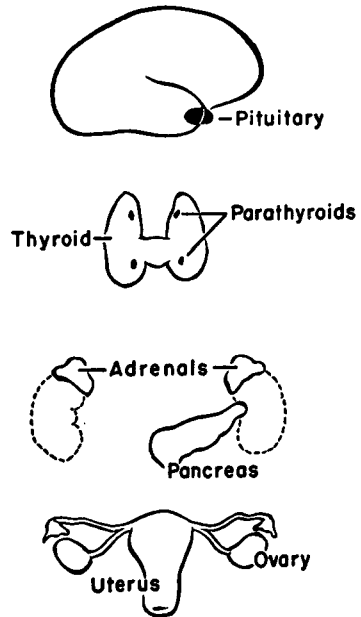


Fig. 2

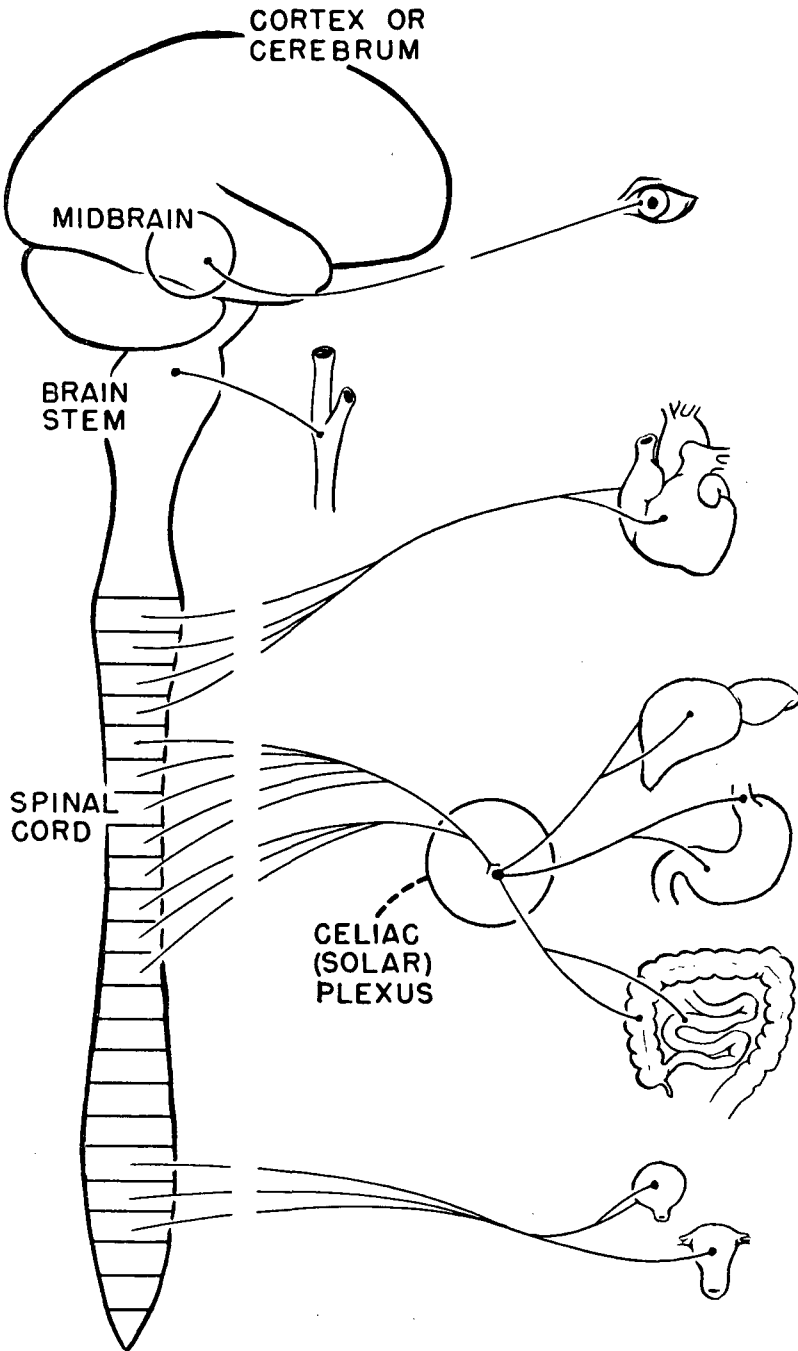


Fig. 3