Remarks on the Association of Morbid States: by Gulielmus Henricus Dixon.

"So runs my dream; but what am I? An infant crying in the night: An infant crying for the light: And with no language but a cry."

Tennyson.
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Introduction.

1. There is no subject of study in Medical Science, of greater interest or more importance, than that which it is proposed to discuss in this Thesis, whether we regard its intimate connection with Physiological and Pathological inquiries, or its practical value to the Physician. Like many other interesting and important matters, it is not only in recent times that it has engaged attention for at an early period in the history of Medicine it was recognised as worthy of discussion, although little progress towards sound theory was made owing to the crude state of Physiological and Pathological knowledge. It is, indeed, only in modern times that, by superior methods of investigation in these sciences, facts are now known which enable us to explain the present subject of discussion, better than was formerly possible. And although we do not hold that even our present knowledge enables us fully to understand and explain the subject in every respect, yet are attempts to construct and apply a theory, on the basis of known and probable facts, will not, perhaps, be considered as time misemployed.
2. Sympathy, or reciprocal influence between organs and parts of the body, is a property scarcely possessed by the lowest orders of animals, being peculiarly characteristic of those at the upper end of the scale, and of the human subject in an eminent degree. Nondigested matter in the excreta of the bodies of the Protozoa, may remain there for a long time without abridging the life or activity of the animal, and can be excised without effort, torture, or pain. But in the human subject how great are the evils and sufferings, not only of the immediate organs of digestion, but of other and distant parts, produced by similar causes! In this case they are truly irremediable, and more rapidly, followed by a train of frightful consequences, extending, moreover, through the whole constitution, forming the well-known disorder called Dyspepsia, with its associated morbid sympathies. All animals belong to a comparatively perfect from the suffering to which he is subject, as a consequence of his inferior organization, and the subtle sympathies subsisting between the various organs and parts.
of his body, and between these and his mind. The mind, indeed, which accompanies all human beings to man, is a peculiar gift of God to man, peculiarly adapted to organization which he possesses in common with inferior creatures, is capable of so acting on the body as to give rise to its own class of sensations, the like of which sensations in all animals but those of man are necessarily free. Throughout the human body, such are the intimate, complex, and sympathetic relations of parts, even quite distinct from each other in structure and function, that, to speak, a mutual intelligence and understanding exists amongst all, that the consent of each shall be essential to the preservation of regularity and order in the economy. The proper and proper discharge of duty on the part of each distinct structure, is required for the general welfare of the community of tissues and organs; and the harming of any through the system is disturbed by a failure in duty of any part, or by the agency of any foreign interference. The mind is not exempt...
from the operation of this general law of reciprocal mutual influence: in fact, the sympathy between states of the body and conditions of mind, far and near, are some of the most remarkable and yet familiar illustrations that can be found.

3. Although it is during the existence of morbid states that we find the most evident proofs of the reciprocal influence between organs and parts, constituting morbid sympathies, yet sympathetic actions are by no means inoperative in a state of bodily health. The concert of all tissues and organs to act in concert and to maintain the vital equilibrium, may justly be called sympathetic action, but it is when broken, that this law, like all others, more positively and distinctly manifests its operation and force. During health there is a vicarious action amongst organs and parts, according to which she does duty for the other, when either would otherwise have too much to do. This is sympathy. Why this meansius, conservative, conserving, this law is interrupted, when one part of process ceases to do duty for another part or process, oppressed with heavy labour; it is then
that the latter pelves, and that other feet seem
putrid with its distress. This is morbid symp-
pathy. Sympathies in health, are actions be-
longing to the normal vital endowments of the
parts and organs concerned, and are provisions
of nature for maintaining the general vital
equilibrium. Morbid sympathies are process
not connected with normal vital properties,
and frequently indicate the efforts of Nature
to recover her lost dominions, but they are
often also evidences of the stronghold which
Disease has made for herself, often success-
ful resistance which she is making to the ef-
forts of healthy action, and perhaps some signs
of her ultimate triumph over life.

14. Consciousness does not attend
sympathetic actions in a state of health, the
vicarious and complicating actions going on,
in this state, without sensuation. But it is
difficult to say, whether morbid sympathies
ever occur, without producing sensuation at
some period of their progress. This will depend,
according to accepted doctrines amongst phy-
sicists, upon the functional participation of
The cerebrum and probably its ganglions, which together make up the seat of consciousness, is in the chain of phenomena constituting the sympathetic process. The question resolves itself into the general question of the possibility of morbid action occurring without depression. Sensation has many varieties, but some kind or degree of that sensation which we call Pain is the usual manner in which we are made conscious of morbid state. Now as Pain, so far at least, as we can understand it, seems to be a conservative institution of nature, by which we are warned of some disturbance in the economy requiring attention and care, and as it is so universally felt in the course of disease, it is not easy to decide whether or not, it may be entirely absent during the whole successful morbid action. These, or, however, instances in which the pain is felt at a part distant from the seat of disease, but having a nervous connection with it. It is hardly necessary to remark, that as the integrity of the cerebrum and adjacent nerves leading to it, is necessary to sensation, if the functions of these organs are
destroyed or suspended, then there cannot be any consciousness of any condition of the body. But it is said that lesions of the nervous centres themselves have occurred without great cut out without any pain or consciousness of any kind. Letting these cases aside, however, it is not easy to determine whether morbid sympathies or morbid states in general can occur, unattended in their whole course, by consciousness.

5. As regards the historical aspect of morbid sympathies but a few words need be said. Not a little has been written on sympathies in general as well as on morbid sympathies in particular. That diseases are partly seen single, but usually in groups (although perhaps the group only being named), the individuals of which are connected together by a latent coalescence operating amongst them, has long enough been known. And different theories have, from time to time, been constructed, for the purpose of explaining these facts. The materials employed for these theories, in some time, were the Nervous System, and certain relations of the fluids and glands of the body. But nothing
poorly known of their structure, vital properties, and laws of action, to render any of these theories and descriptions of these morbid symptoms consistent and tenable. In modern times, more scientific methods of investigation in Physiology and Pathology, and consequently, more accurate and profound knowledge of these sciences, has enabled us to discover multitudes of new facts and to establish our theories of vital operations on a broader and sounder basis.

These advantages over our predecessors, have extended their influence through all departments of Medical Science, so much so as to make modern doctrines in Physiology and Pathology conjecturally preferable to old opinions. To insert here, therefore, a historical sketch of old opinions on morbid symptoms would be made an idle display of learning, and could not be attended with any advantage to benefit.

6. The expression "morbid symptoms" is employed in this Thesis, not for its accuracy, but because it is so frequently used as a name for those morbid actions we are speaking of. It is used as synonymous with "morbid"
"sequences", and associated morbid states.

What all these terms are here employed to denote are these groups of disorders in the same different parts or organs, the members of which groups are associated and connected by some law of causation operating amongst themselves of. The practical importance of this subject will appear, when we reflect that some seldommeet diseases, which are not made up of an association of disorders, connected together, and which are not prone to involve other tissues and organs, there those where the primary impression is made; in this particular, we cannot scientifically and successfully select the proper point of attack, nor employ the proper remedies, unless we understand the means and manner of the action and association of morbid states. Moreover as primary diseases are often entirely masked by their consequent morbid states, which depend upon the former, and disappear along with them, to begin by treating
The treating the latter would emphatically be beginning at the end. And although we may not always be able to treat diseases according to these principles, owing to our limited knowledge of vital processes, yet we may be sure that this is the most philosophical method and will become more and more certain in practice as our knowledge increases.

8. In this Thesis it is not pretended that the theory of sympathetic actions here laid down will sufficiently explain every case; nor is it undertaken to give an account of every known group of associated morbid states. The undertaking would be too great, and the pretension absurd. Theories change as facts accumulate. The facts of to-morrow put to flight the theories of to-day. All that it is proposed to do in this Thesis is to mark out the ground on which associated morbid states may be accounted for, leaving the formal details of the principles and the methods of applying them for others to judge; and to illustrate the doctrines by selected examples.
Preliminary Observations.

1. As objects are best seen when brought within the range of as many rays of light as can be made to converge towards them, so special topics are best understood when viewed by the light of as many arguments as naturally bear upon them. For this reason a few preliminary remarks on matters intimately connected with the subject of the Thesis, will not be inappropriate. — Life. Life is a very difficult thing to define. What is generally meant by the term is a series of actions peculiar to animals and vegetables. We know nothing at all about it except as it manifests itself, through the medium of peculiar forms of matter, called organised. The properties of this organised matter do not depend on the nature of the particles which compose it, but they depend upon the intermixture in which these material particles are arranged together. The accomplishment of this peculiar arrangement of material particles is the first development of life. This is to us an invisible active, and cannot be described. But after the formation of this matter, it passes through
a series of actions, which we do see, and which we can always recognize as peculiar to
such organised matter. These actions primary
and secondary constitute life. During this
peculiar activity of the organised matter, it may
either retain its primary simple structure and
form, and so begin, continue, and complete its
life, or it may undergo development into more
complex and higher forms, which, after reaching
their full development, pass through their
appointed term of life. When this term, which
has its peculiar limit in each case, is completed,
the characteristic changes of life entirely cease.
This is death, which is indissoluble from life
as we know it. The simplest form of life is a
cell, the most complex is but a multitude of cells
of different kinds and having different properties,
arranged in a definite manner, and in the nor-
mal state always preserving this definite arrange-
ment. An essential condition of the life of complex
organisms, is the incessant birth, life, repro-
duction and death of the elementary cells which
compose it. The form and arrangement of those
being constantly maintained until after the death,
of the whole structure. Now the actions of organised matter, constituting life, must have a cause, and this must have the nature of a power or force. Hence we use the term Vital force to express our conception that something which first forms an organism and then continues in it that series of actions constituting its life. Let us then say that life is the evolution of Vital force through the medium of organised matter.

There are certain other forces in Nature which we distinguish from the Vital as consequences of their characteristic medium of evolution, being a kind of matter quite different in form and arrangement of particles from the organised, and which is called inorganised matter. These forces are Physical, Chemical, Electrical.

All we really know of the nature and difference of these forces, Vital and the rest, is their different and characteristic modes of evolution, through their own peculiar forms and arrangements of matter. But we are not to conclude from this that Life, or the evolution of Vital force from organised matter is entirely independent of all aid from the other forces whose characteristics...
Every operation is in unorganized matter, and which we may for convenience call by the general name of Physical forces. In fact we do not know any truly independent operation of Vital force. The latter is only able to manifest itself, leases acting in association with the former. The Vital and Physical forces are co-related, if not convertible, in the production of the phenomena of life. That is to say, the former must employ the agency of the latter to accomplish its own complete production from organized matter. But the Vital guides and directs the operation of the Physical forces for the fulfillment of its own purposes; and its full and complete development depends upon the force which it exercises from the first and maintains to the last, of keeping the latter under due control.

The Physical forces have an extensive field of duty in living organisms, where their operations are necessary and indispensable, but when these operations are modified by the action of the Vital force. Thus in the typical idea of life, in which it attains its complete development, in which it is so unity, there is established a peculiar adjust-
ment of equilibrium in the associated actions of
the Vital and Physical forces. Life is the resul-
tant of the action of Vital and Physical forces
upon organised matter, but we are utterly un-
able to subjet these elementary forces and their
resultant to the laws of number, as we do in the
parallelogram of forces in Mechanics.

2. Health and Disease. The idea
of Life, Health and Disease are correlative. We
cannot think of one without thinking of the
other. Health and Disease are States of life.
Health is perfect, unaltered life; Disease is in-
perfect, modified life. If we regard normal
life in an organism, as due to a certain adjus-
tment or equilibrium of Physical and Vital forces,
then we may define Disease as the consequence
of the disturbance of this equilibrium. An or-
ganism enjoying perfect life and health, we have
the Vital force maintaining its supremacy and
compelling the other forces to aid in its work of
conservation and of producing activity. In a
diseased organism we find that at some period or
other of its life, there has been a disturbance of the
normal existing association of the Vital
and physical forces, so that the former has for a time at least, yielded its authority and control over the latter, which, not being able to carry on the vital processes, lay the foundation of a new and morbid action, by their undirected efforts. After a time, the vital force perhaps returns, but frequently instead of restoring the lost normal action, only continues the morbid process already commenced. In this way morbid actions acquire a vitality of their own. But this is at present still degenerate vitality, and under the new conditions in which it operates, has a downward tendency, yields more easily to the disturbing action of physical and chemical forces, and perhaps is entirely driven away at last, when death and decomposition supervene. This may be called the triumph of the physical over the vital forces. Between these two extremes, where the vital force has supreme control, and where it finally yields its authority, there may be many disturbances of equilibrium or oscillations to and fro, upwards and downwards, producing various grades of morbid action; and where the normal equilibrium has once been lost, it is not always
easily re-established, and even if it be so, it is
more easily disturbed a second time. These oscil-
lations in the normal adjustment of vital and
mortal physical forces, may serve to account for oc-
currances in the kind of actions, constituting life.
For variations in degree we must suppose that
the relative adjustment of equilibrium has not been changed,
but that the action of all together is equally, either
increased or diminished as the case may be.
Hence variations in kind from the normal type
of life, may be ascribed to the disturbed equilibrium
of the vital and physical forces; variations in
degree, to their equally increased or diminished
action. Objections maybe made to this pathogentic
doctrine, but as these forces, acting in concert, are
the causes of the properties or actions of organised
matter; and as health and disease are but varieties
of those properties, it seems reasonable to ascribe
such differences to variations in the mode of action
of the forces. Whether or not these alterations occur
as above supposed, we will, at least, find it con-
venient to explain morbid states by referring
them to variations in the mode of evolution of
the forces operating in organised matter; these
variations being sometimes in kind, sometimes in degree, at other times in both together.

3. Vital and Physical Properties. From what has been said it will appear that the term Vital force is used to explain those phenomena of life which cannot be accounted for by means of the physical forces alone. These forces, during life, are always associated together in their action; but it is convenient to employ the term Vital force alone, in explaining these actions, because it is the characteristic agency of their production, always remembering that when we speak of Vital we necessarily imply the existence of physical forces. Now in the higher organisms we distinguish two modes of evolution of Vital force, primary and secondary. The former is concerned in the formation, perpetuation, growth, and reproduction of the various tissues composing the body: muscle, nerve, bone, etc. In the latter, the Vital force reaches its ultimate purpose, in some tissues which is the production of a series of actions, of a peculiar kind, in addition to those just mentioned. These primary and secondary modes of manifestation of Vital force, have been called Vital Properties of the Species, the former constituting the General, the
latter, Special Vital Properties. The General Vital Properties are those of Assimilation, by which each tissue selects and forms its own peculiar kinds of organized matter from the general nutrient element. Special Vital Properties are possessed by nerves and muscles. That of the latter is Contractility, by means of which the particles composing the muscle change their relative position in such a manner that its dimensions are diminished in one direction and increased in another, the return of the particles to their original relative position being called Relaxation. The Special properties of nerve are Conductibility, by which is meant that an impression made upon one extremity of the nerve, is conducted to the other extremity; and the peculiar property of converting such impressions into actions of quite another kind. The impressions conducted to muscle are converted into Contractility; those conducted to the brain are these converted into Sensation, which we may call a Vital Property of the cerebrum, and which is the conscious receipt of an impression; those conducted to the epiphysis are converted into a modifying influence over nutrition and assimilation. Where Special Vital Properties are possessed,
they are inherent, and arise out of the peculiar nature of the tissue. But certain conditions are requisite for their development. These are called Stimuli.

The usual stimuli for the contractility of muscle is nervous influence. Stimuli for nervous action: physical, mental, mental. Stimuli are also healthy or morbid; the former if producing the normal vital action of the tissue upon which they are impressed, the latter if initiating some morbid change in these actions. There is, in fact, a great variety of stimuli, both healthy and morbid, and these are followed by almost as great a variety of effects; and this is reason to believe that, in the case of nerves in particular, stimuli are conducted by particular nerve fibres and finally converted into their own particular effects on the tissues or fluids of the body.

When the vital property of assimilation has formed the tissues, they necessarily become endowed at the same time in all cases, with certain physical properties. These are nothing but the evolution of physical forces, as vital properties are the evolution of vital forces. But vital and physical forces, being associated together, and varying
with each other, so vital and physical properties, which are the effects of the forces, are also necessarily associated together, and vary with each other. Physical Properties are General and Special, the former being primary, the latter secondary, modes of evolution of the physical forces. The former are sufficiently obvious:—

hardness, softness, solidity, fluidity, color, weight, etc.
The latter are Elasticity, belonging to "Yellow Tissue," and Tenacity belonging to "White Tissue.

4. The object of the foregoing remarks on Life, Vital and Physical Forces and Properties is to show that the law of associated actions in the animal economy is general. If the elementary forces operating through organised matter are associated in action and vary with each other, as it were by a peculiar and subtle sympathising, so all the properties actions of the tissues which are the ultimate development of the forces, are necessarily associated in their operations, and vary with each other. And this is true of both health and disease, as well as of healthy actions. The sick states of all forms, are the results of alterations of winds and also of degree, or of both, in the mode
of evolution of the forces. The commencement and development of morbid states will depend upon the resistance which the Vital Force opposes to these disturbing causes. Slight impressions will be followed by slight effects; there not extending very far, so that the association of morbid actions may not be very manifest or important. But some potent causes, will be followed by more strenous and more numerous consequences, producing an extensive association of morbid states. — A few examples to illustrate preceding observations may here be stated:—

Morbid changes of degree, but not of kind, in the vital property of assimilation give rise to Hypertrophy and Atrophy, and the altered physical states thus produced, after a time, more or less, with the special properties which the part possesses, as in Hypertrophy and Atrophy of the Heart. Morbid changes of mind in Assimilation, as in Atheromatous and albuminous deposits of the Arterial tunics, so alter the vital actions and physical properties of the blood vessels, as to interfere with all their functions, even changing the
nature of the plasma passed through their walls and thus inducing alterations in the nutrition of other tissues. Disturbances changes occurring in nervous matter, may actually suspend its function, and as a consequence, all the vital properties of the tissues, whose appropriate stimuli are the lost nervous influence, will also be suspended, and this again will be followed by nutritive changes in them, as in muscular paralysis. Mortal stimuli, acting on nervous centres, may so entirely alter the nervous influence transmitted to organs and tissues as completely to modify their vital actions; thus we have the Tetanus of Hydrophobia, and all the other paroxysms of putrefaction both mental and corporeal, which belong to that disease, and thence also we have the associated states, so extensive and serious, characteristic of the effects of malaria and fever poisons. The power of morbid mental states to perfect Secrecion and Nutrition, and the special vital endowments of particular organs,
as well known; thus the hair may change its color in a few hours from intense fear; prolonged anxiety will induce disease of the heart; grief and disappointment will take away appetite, and induce morbid actions of the abdominal viscera. Thus the ground has been marked out, on which to construct a theory of associated morbid states, and a general idea of the nature of the process according to which they are produced. It now only remains to classify and still further to illustrate the so-called Morbid Symptomata.
Morbid Sympathies, or Associated Morbid States.

5. Definition. Morbid sympathies, or associated morbid states, may be defined to those groups of disorders, whether of structure or of function, the several members of which are connected as associated together by some law of causation.

6. Media of Association. The means, channels, or instruments by which disorders are associated are: 1. Nervous connection of parts affected. 2. Vascular communication. 3. Continuity of structure. 4. Contiguity of parts or organs. 5. Similarity of structure. These several modes according to which a morbid action in one part or organ, induces disorder in another part or organ, may be conceived in the procession, either singly, or in various combinations. They will serve as a basis for an arrangement or classification of morbid sympathies: and although it is not by any means the best arrangement that might be chosen, yet it will suffice for our present purpose, which is not to give an account of every group of associated disorders, but simply to lay down its general principles for explanation.
of these morbid processes, and to illustrate these principles by a selection of cases.

7. Morbid States associated by means of Nervous connection. — An attempt has been made to show in the preceding sections, that, although the tissues of the body have both general and special vital properties, which are independent phenomena, and developed according to their own peculiar laws, yet that all vital operations are associated together and vary with each other, in health and disease.

Now there are two extensive and important bonds of union in the body, which bring all parts and organs into a most intimate relation and connection with each other. These are the Nervous and Vascular Systems. With respect to the former, of which we are now speaking; viz; The Nervous System, it is scarcely possible to over-estimate its great influence over the vital processes, during morbid, as well as healthy actions. A very large and important class of associated morbid states are now referred to the influence of the Nervous System. It is impossible, however, to do more
in this place, them to select a few examples.

8. A. Fever. This is a disease which involves a remarkable perversion of all the functions of mental, animal, and organic life. Its symptoms are, listlessness, mental and bodily debility, great thirst, and alteration of animal heat, secretion, circulation etc.

The cause of these phenomena have been subjects of dispute from the time of the seven Wise Men of Greece, and the question cannot be regarded as yet quite settled. From the facts that, frequently, no lesions of structure can be detected after death; that where lesions are observed, they are not commensurate with the symptoms; and that sometimes lesions are found which indicated their existence and progress, during life, either imperfect or not at all; we cannot reasonably infer that lesions of structure are the proximate causes of Fever. The Fever symptomatic of Inflammation is, of course, not included with the Fever now referred to. Moreover the mode in which Viruses propagate themselves by infection is opposed to the idea of their proximate cause.
listing lesions of structure, except of course, it shall henceforth be termed, by microscopic research, that all lesions affections, originate in lesions of structure, invisible to the naked eye. These and similar considerations, which it is not necessary here to enter into, have led Pathologists to infer that the proximate cause of Fever, is a morbid impression on the nervous system. It is true, still dis- tinctly question is one involving such a mass of argument, it is impossible to discuss it fully in this Thesis. It is therefore assumed as most probable that the proximate cause of Fever is a morbid impression, made upon the organic system of nerves; the first point of impression being generally in the lungs. Five facts, confirming this theory, may however, here be mentioned:—1. The systems primarily and simultaneously, disturbed in Fever, are the Respiration, Circulatory, and Digestive systems, all of which are under the influence of the organic nervous system.

2. The accession or progress of Fever may be prevented or cut short, by remedies
which are known to act on the nervous system.
Assuming then, what is most probable, that the
proximate cause of FEVER is a morbid impres-

sion on the organic nervous system, a brief ac-
count of the progression of morbid phenomena
will here be given in an extract from Dr.
Copland’s Dictionary of Medicine,” Art. Fever,
section 100. “In order to know what appears to be
the common progression of morbid phenomena,
consequent upon the impression of the exciting
causes, I shall premise that a person in health,
with no particular organ especially disposed
to disease, is exposed either to infection by the
effluvia from a patient in typhus, or to the
operation of marsh ablations. In these
cases the exciting causes floating in the air,
are received into the lungs, and, if they be con-
centrated or energetic, they slightly, although
they may sensibly affect the organ of smell
in their passage. But their chief action is
exerted upon the nerves of the lungs themselves.
It may even be admitted that they also partially
affect the blood during the digestion of the air
which is their vehicle, by the lungs: of this,”
"however, we have no satisfactory proof; and of their direct operation on the nervous influence of this organ is insufficient to produce all the phenomena, it is unnecessary to assign an additional agency to explain them. The morbid impression having been thus principally made in this quarter, it is necessarily extended to those organs which are chiefly supplied with the same system of nerves; and thus the lungs, the heart, and bloodvessels, the digestive organs, and the secreting and assimilating functions, almost immediately experience the effects. As regards the lung, their vital resiliency is somewhat impaired, since the frequent and forced inspirations; and the changes effected by the air upon the blood, which, although chemical, are partly also vital or influenced by the organic nerves. The air of the organ, are more or less impeded. — The effect, then, of the morbid impression on the organs, proves influence of the lungs, tending to diminish the changes caused by inspiration on the blood, and to render the pulmonary circulation more languid, one source of the alterations observed in this fluid in the early stages of fever, removed."
manifest. These alterations at this period seldom extend beyond a darker or more bluish appearance of the blood, than usual, the cæsaureum, being thensoft, and imperfectly separated from the blood, almost contemporaneously with the effect upon the lungs, the action of the heart and the tone of the vascular system generally, become diminished. Hence the increasing languor of the circulation, the internal congestion, and the deficient secretion and excretion, then, last, however, depending as much upon the state of organic nervous influence as upon the circulation in the secreting organs. The congestion of the large vessels, and the change in the quantity and quality of the blood, consequent upon deficient secretion and excretion of its watery and muscular constituents, having reached a certain pitch, bring about vascular reaction, if the organic nervous influence be not too reduced, or otherwise altered by the exciting causes; but when the morbid impression has become very intense, and the more immediate change very great, reaction either takes place imperfectly, or does not supertene at all, in extreme cases, vital powers being insufficient to develop increased
vascular action. Such appears to be for the
progress of the phenomena, as respects the organic
functions. The electro-spinal manifestations
are also early affected—in a slight and passing
manner by the impression made by the previous
affluence on the nerves of smell, but much
more seriously by the influence exerted by the
organic nervous system upon the brain and
spinal cord, or extended from the former to
the latter, and consequently by the changes in
the states of vascular action and of the blood.

As to the question, whether or not, in fever, the
blood or nervous system is primarily involved;
it may be remarked, that in either case, the
nervous system very quickly takes on a morbid
action, and induces morbid changes of kind
and degree in all vital processes; solution is
suspected, muscular contractility is lost, secre-
tion and assimilation performed; all of which
operations are directly influenced by nervous
action. The remarkable disinfection of
the faculties, especially the muscular, would
seem to indicate that physical forces are triumph-
ing over the vital, no consequence of a disturb-
ance
of that vital equilibrium or adjustment spoken of in the preliminary observations. With these remarks we must conclude this illustration of associated morbid states produced through nervous connection.

9. Convulsive Diseases. These disorders furnish us with numerous examples of morbid sympathy. There are two modes in which convulsions may be produced: 1. By a morbid sensibility of the nervous centres. 2. By a source of nervous irritation at the peripheral extremity of an adjacent nerve, which irritation is propagated through a nervous centre and motor nerve; hence arising, to muscles convulsed.

Convulsions, both idiopathic and traumatic, may be produced according to either of these modes. If originating in the second manner, it may cease with the disappearance of the peripheral irritation, provided that be remedied at an early period of the disorder. If this be not done, the nervous centres become involved into a morbid change which, once established, becomes the cause of the convulsions. The nervous centre usually concerned in ordinary convulsions is the spinal cord, the cerebrum not.
being usually involved. But in the Tetanus of hydrophobia, convulsions are occasioned by impressions on the nerves of special sense of taste, sight, hearing; and are from the consequence of ideas. So that in this case the cerebral as well as spinal cord are concerned in the morbid action. In Tetanus the muscles of respiration and deglutition are generally the first to suffer the spasmodic affection, but other muscles, sooner or later, become involved. The functions of the intestinal canal, also are altered; the bowels constipated and when opened, the feces having a peculiarly offensive odour. From this we may infer that alterations of secretion are also induced by the morbid nervous actions. The odour of the perspiration which is oppressive during a paroxysm, is also said to be of an offensive kind, affording another instance of altered secretion.

In Epilepsy so far as convulsions, asephoria, and loss of consciousness, produced by intestinal irritation, which morbid sequelae cannot be explained on the theory of reflex action through the cords and medulla oblonga.
In Hysteria we have a host of remarkable derangements of function, many of these closely simulating other, and much more serious disorders, produced by derangements of the sexual organs and by morbid emotions and ideas, through the medium of some portion or other of the nervous system. Hysterical derangements are, however, comparatively not serious, and although often remarkably resembling Epilepsy and Hydrocephalus, are generally to be distinguished from these diseases by the absence of Apoplexy and Loss of consciousness. — The various Spasmodic Affections, also, afford many illustrations of morbid actions associated together by the nervous system, of which Spasmodic or Symptomatic Asthma may here be mentioned. This affections consists in spasmodic contractions of the muscular fibers surrounding the minute Bronchial Tubes, produced by a source of nervous irritation in quite another region of the body, frequently in the Intestines, and sometimes in the Vaters. These forms of Asthma depend upon the conduction of a morbid nervous action thro
ceeding from the Splanchnic or Visceral irritation, through the Sympathetic system, to the Spinal cord, thence to the Medulla Oblongata, and thence through the Pneumogastric to the Lung. In such cases the Asthma will not disappear entirely, until the irritation existing in the Abdominal or Pelvic viscer is removed. In addition to this, we may expect to find alterations in the state of the Blood and through this, of nutrition generally, owing to the frequently interrupted respiration. Morbid alterations of nutrition in one part are frequently associated with peripheral as well as central nervous irritation in another and distant part, the former affecting, depending upon the latter and being removed along with it, but not otherwise. An example is furnished by ulcerative and sinus of the cheek, connected with irritation of the Dental nerve by a diseased tooth. We have another example in a case recorded by Sir Benjamin Brodie, where the ankle sloughed, twenty-four hours after an injury to the Spine. — Persecutions of sentiment.
are now mostly referred to alterations of nervous influence, and there is reason to believe that these nervous alterations are not of degree only, but also of kind; for, alterations in the quality of secretions cannot be explained, on the supposition of a change of nervous influence on the capillaries, if this can only regulate the quantity of the secretions. Alterations in quality must be referred to the conversion by the nervous influence of the secreting secretion, of morbid impressions made upon them into a morbid vital influence over the secretion, whereby it becomes changed in kind from the normal state. Take for example the secretion of skin by the cutaneous sweat glands, when the functions of the kidneys are suspended. Another illustration of morbid influence producing morbid secretions by nervous agency is found in the case of excessive mental emotions, on the part of the mother, so persisting the quality of the milk secreted by her, as to throw her infant into convulsions ending in death.

10. In what has been said in the preceding section, reference has frequently been
made to the influence of morbid stimuli in producing morbid nervous actions, and these again giving rise to morbid changes of Con-tractility, Secretion, or Nutrition. The all these cases we have not yet been able to observe and actually to note, all the links in the chain of morbid phenomena. Some links we do see during life, others we discover after death, and others we have never seen, and perhaps never will see, but are quite satisfied to their existence suffer from good grounds of scientific research. Leaving mental influences out of the question, we do not see, cannot appreciate, yet we suppose the material existence of morbid stimuli, and in the cases of Fever, Hydrophobia, and other cases as Epilepsy, Hysteria, Morbid Nut-rition, and Secretion, we can form more definite ideas of the stimuli which are the sources of irritation and all the morbid sequences. But hitherto nothing of any material structural change of persons tissue which is the medium of conducting or propagating such morbid impressions we most cases of the above disorders. We can
Reflax acte mit abwed t' ges llen in the und scientifis explanation of th fact.
noticed differences, more or less remarkable, in
the several cases, sufficient to enable us in
the majority of instances to distinguish between
them, but these are differences in the ultimate
modes of manifestation of the motor stimuli.
We cannot tell what are the differences in nature
between the processes of Fever and Hydropho-
bia, yet we perceive their different modes of
manifestation. We do not know the differences
between the nature of the irritations of Tetanus,
Hydrophobia, or Hysteria; yet we notice that
they are different disorders. We may satisfy
ourselves, to some extent, by supposing that
different nerve fibrils and corpuscles, condu-
ting different effects of different stimuli. But
this is not gaining much advantage. Perhaps
the equilibrium of the Vital and Physical
forces, maybe disturbed, in different ways,
producing different diseases, by an infinite
variety of changes in the relative position of
the atoms of organized matter, which changes
maybe for ever beyond our perception.
Without, no connection has been established
or discovered between the nature of different
morbid stimuli, and the corresponding differ-
ences of nervous action, including not only these
molecular changes which we may imagine
to occur in the nervous matter, but also those
ultimate molecular changes of contractility,
nutrition and secretion, induced by the altered
nervous action. These processes form a part
of that Histological Chemistry, which is
at present, at least, as sealed book; and
which, in the mean time, we refer to Vital
actions, because we are unable to give them
a better explanation.

11. Morbid States associated by
means of the Vascular System. The
morbid sequences arising from disorders of
the Blood, or produced through the vessels
as channels of communication between affec-
ted parts, are very numerous and important.
In many groups of associated diseases, as
those produced by fever and similar poisons
or contaminations, it is a very difficult matter
to decide whether the Blood or the Organic
Nervous System is the first to be affected.
Perhaps the very intimate anatomical and
Physiological connection existing between these parts, will always render this a difficult question. Morbid actions of the Organic Nervous System are sometimes the causes, sometimes the consequences of disorders of the Blood; and it is this intimate connection that makes it states of the one are almost invariably associated very soon, with altered conditions of the other.

From this close relationship between Nervous System and Blood we might infer that the latter has a special Vital endowment of its own, which is associated in action with the special vital properties of the organic nervous system, and varies with these. The Blood is indeed regarded as having vital properties peculiar to itself. These are chiefly manifested in its self-maintaining power, the efficient agents in the process being the Blood Corpuscles. Hence we endeavor to connect diseased conditions of the Blood with alterations in the form, size, color and other properties of the Corpuscles; and changes in these with disorders of the Blood. In this case we have an example
of a certain assumed equilibrium of the Vital and Physical Forces, as being the ideal condition of health; and as a certain disturbance of this adjustment is constituting disease. From the altered Physical properties of the corpuscles we infer the existence of a degenerate Vitality. And, further, we even endeavor to associate particular alterations of the corpuscular Physical properties, not only with particular blood-diseases, but also with diseases of other organs and parts of the body. But the Vital Chemistry of the blood, although a study of vast importance, is yet little understood; and even Physiologists are not agreed as to what the healthy standard of composition really is. And although it may be difficult to enumerate all the compounds which should be present in healthy blood, it is not so difficult to find out what should not be contained in it, indicative favorable health, and what Physical properties it should not possess. The sources of alteration and contain
Variation of the blood, may be here classed under four heads:—1° Morbid actions of the organic nervous system. 2° Morbid conditions of the blood-forming glands. 3° Interruption of secretion. 4° Absorption of deleterious matters, through any channel, tissue, or organ, or digestive mucous surfaces.

These causes, taken all together, produce various and complicated effects upon the state of the blood. These effects are chiefly differences as to fluidity, coagulability, color, odour, and chemical composition.

These several kinds of variation in the condition of the blood, are associated with and indicate a great variety of morbid states in other parts of the body. It is impossible to notice all the morbid states thus produced; a selection only can be given; and it is to be remembered that, owing to our present imperfect knowledge of blood diseases, we are unable to say in many cases, whether the altered blood is a cause or a consequence of the associated morbid states of other parts.
and also, in other cases, whether the pri-
mary morbid impression, first alters
the state of the blood, or that of the organic
nervous system. — A. Leuoevtheriaemia.
The characteristics of this disease are
increase of the white, and diminution of
the red blood-corpuses. It may be a
consequence of great loss of blood, exhaus-
ting chronic diseases, or serious acute dis-
cases, as typhus and typhoid fevers.
It would seem to be associated with other
changes in the blood in addition to that
above named; for, Sehorey found, in one
case, that the blood contained gelatin,
lactic, acetic, and formic acides, and
a substance called hypomanderin. The
other morbid associations of this affection
are, enlarged liver and spleen and
diseased conditions of the lymphatic
glands, sometimes also of the thyroid
gland and suprarenal capsules.
Owing to our present limited knowledge
of this disease, it cannot be determined
whether the morbid condition of the blood
is a cause or consequence of any or all of the associated diseases. To decide this question is evidently a matter of great importance, and maybe done as facts bearing on the case are accumulated. Diarrhea, cholic, and purulent eruptions, are sometimes attendant on Leucocythemia.

In concluding these remarks on the associated morbid states of Leucocythemia, it may be noticed that in the British and Foreign Medical and Chirurgical Review" for July 1859 a case is recorded in which the disease was traced to an inflammatory state of the lymphatic glands. And perhaps we may at present refer the disease primarily, to a morbid vital action of the blood glands, all of which, owing to similarity of structure or of function, and to organic nervous connection, sooner or later take part in, and maintain the vitiated process.

2. Ichorrhæmia. This is a curious example of a variety of morbid states associated by means of a peculiar poison supposed to find access to the blood. These blood poisons are derived from various sources,
and their effects are numerous and serious. They may originate from certain kinds of poisons, from the bites of venomous reptiles, and from certain animal fluids found in dead subjects. In some cases the individual inoculated dies suddenly. In others, the liver, and mucous membranes, the intestinal canal are chiefly affected, producing copious discharge of dark bile, and severe diarrhoea. In others, pleurisy, pericarditis, or peritonitis are induced. In some pyrexia and mydriasis; in others abscesses in the lungs, liver, joints, or eyes. Delirium, yellowness of skin, and offensive perspiration are often the consequences of this affection. Here we have an extensive association of morbid states, apparently occurring in groups without law or order of any kind. But it is reasonable to presume that there is a law regulating such morbid sequences. What we are most sure of is, not that there is no law, but that we are ignorant of it. Perhaps we may, perhaps, have found a few links, belonging to the chain of events, but the rest, which would make the chain complete, we have not.
In order to throw more light on the laws according to which morbid states are associated with consequent of poisonous matter finding access to the interior of the body, we resort to a process of reasoning by analogy from the laws governing the physiological action of poisons, with whose chemical and other properties we are familiar. And this reasoning will apply in all cases, whether or not, the primary morbid action is produced on the blood or on the nervous tissue, or elsewhere. The chief law derived from this source, and bearing in the present subject is that of the Specific Action of Poisons. According to this Poisons must, introduced into the body, do not act by chance on any part or organ. Each has a remarkable preference for a particular tissue, or organ, or system of organs; but some act on all parts together. Digitalis acts directly on the Heart, diminishing or arresting its action. Strychnine acts on the Spinal cord, and through this on Voluntary Muscles. Antimony acts as a Diaphoretic, or in general, or as an Emetic, according to the dose. Opium acts on the Nervous System generally, and through this on Secretion,
and nutrition. We may explain these specific actions by remembering what was said of Assimilation in the Preliminary Observations. Assimilation is a General Vital Property, but it has many Species. Each tissue has a specific property by which it chooses what it receives from the general nutritive element. This is a kind of elective affinity. How can we only to suppose that this elective affinity operates in the case of poisons, and then we can understand that each tissue, organ, or system of organs, &c., has a preference for some poisons over others. This theory is applied with good reason to the poisons of Fever, Hydrophobia, Schwannism, &c. &c. The difference in the two cases is that we are not familiar with the chemical properties of these latter poisons, and cannot explain as we can with the others; hence we assume that slight difference of chemical constitution account for the various and apparently irregular effects of these latter poisons. But, as before said, we do not know what the molecular constitution and arrangement of each
tissue is, now do we know what are the molecular
changes which occur in separate tissues or
the application of different stimuli, morbid
and healthy. Hence we can neither explain
nor classify these chemico-vital changes,
decompositions, or substitutions; so as to be-
able, if a certain form and matter be given,
to predict, upon what tissues or organs,
or systems it would act, or what would be
the association of morbid states.

Were our knowledge of vital chemistry even
sufficient to form a system analogous to that
of organic chemistry, then we might have
something resembling the theory of radicals,
homologous series, substitutions &c., &c., which
would possibly enable us to explain the associa-
tion of morbid states better than we can
now account for them. — To the operation
of these chemico-vital laws, involving some-
thing like an elective affinity, we may also
refer, those associations of morbid action
sometimes said to depend on “similarity of
structure,” and on “vital properties in-
herited from the primordial membranes.
of the Embryo." That peculiar law of this
matter operates in the body, under circumstances
scarcely which would lead us to suspect it, is proved
by such facts as these:—Lead, continually
introduced into the system, is drawn especially
to the extensor muscles of the forearms on both
sides of the body, occasioning partial paralysis.
A side of Potassium also, sometimes produces
cutaneous eruptions which are quite symmetrical,
the eruption appearing on corresponding
parts of opposite sides of the body. The eruptions
of Lepra and Psoriasis are likewise symmetrical;
and many other examples might be
adduced.

12. Other associations of morbid
states point where the vascular and organic
personality systems enter as important factors,
might much notice; such as, associated
diseases of the Heart and Lungs, of the
Liver and Heart, of the Kidney and Liver.

[Text continues with further discussions and examples]
of association affections, will sympathise with each other in disease as well as in health; so that where one such organ is affected we may expect its associate to be more or less disordered, and that the nervous and vascular systems together or separately are the means of association. Hence the great importance of anatomical and physiological knowledge to the Pathologist and to the Physician.

For the same reason above mentioned we must dismiss the discussion of the morbid associations depending on contiguity and continuity of parts, whilst although important conditions in morbid sequence, do not involve so many difficulties as the cases before spoken of; and the mode of morbid extension in each of those cases just named, if not quite obvious in itself, is involved or suggested by what has already been said.
Summary and Conclusion.

In the preceding remarks it has been stated that life is the resultant of the evolution of Vital and Physical Forces, through the medium of Organised Matter, and that these Forces, in the production of all the phenomena of Life, are necessarily associated together and vary with each other. Moreover, as the Vital and Physical Properties, or in a word the Vital Endowments of an organism, are the consequences of the evolution of the Forces operating through it, to all the Vital Endowments of an organism, are associated together and vary with each other. It was also stated, that we may conceive of a certain relative adjustment or equilibrium of the Vital and Physical Forces, and of a certain degree of intensity in their action, which, together, constitute that state of life called Health. And that we may further conceive, that disturbances of this equilibrium, and alterations of this intensity, constitute, in the former case, those variations in Kind; in the latter case, those changes in degree of Vital action, which, either separately or together make up the several states of Disease.
But this equilibrium and unity, in the evolution of the forces of life, was not maintained to be fixed with mathematical precision, so that the slightest variation is a morbid acting, but that certain limits, themselves different in different cases, are assigned, within which is Health, beyond, Disease. It was further noticed, that in addition to the Vital and Physical Properties common to all parts of the higher organisms, certain parts had special endowments; but that all Vital actions, were intimately associated together and varied with each other, both in Health and in Disease; and that this association and sympathy of vital processes throughout the whole economy is more especially accomplished through the medium of the Nervous and Vascular Systems. And, lastly, in what manner morbid states are associated, by means of those two great, important, and intimately connected Systems, was briefly, but imperfectly illustrated; allusions being made to certain links in the fundamental processes of morbid associations, not yet found, and the direction indicated where they
should be looked for. — The writer of this
Thesis is aware of its fragmentary character,
of the imperfections of its style, and of the impossibility of properly discussing so vast a subject in so small a compass. The great interest belonging to the subject, and the temptation to choose it for a Thesis, and the frequent interruptions inseparable from daily duties may, perhaps, be allowed to plead as an excuse for the many defects of this production. — It may be remarked, finally, that, although the science and manner of the association of morbid states are more or less tacitly recognized by medical writers, yet the subject does not seem to have received that attention and treatment as a distinct subject, which its manifest importance demands. This defect is, perhaps, to be attributed to the unsettled state of Pathological Theory, arising from that difficulty of obtaining accurate data which is so characteristic of investigations in disease. But it is to be hoped, that as our knowledge of the allied sciences of Physiology and Pathology increases, these difficu-
cultics will vanish. In other sciences, but these impediments of a like nature are in the way of Truth—impediments arising from the Plurality of Causes and the Variation of Conditions. Meteorology and Sociology are cases in point. In such sciences, observation and correlation of facts are the only means of investigation, and even by their aid alone much is yet to be accomplished. But Physiology and Pathology have, more to a certain extent, an advantage over these sciences, inasmuch as these are being more and more brought within the jurisdiction of experiment. That almost infallible test of truth in Theory. Hence although Mathematical accuracy can never be attained in questions of Vitality, we may hope yet to know much more of the Laws of Association and Variation in Disease.