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On Physical Man, or the Phenomena of Life, principally in relation to Nutrition.

When we look over the wide Domain of Nature - the vast chain of beings of existence, with which our world is filled - the diversified modes of existence & modifications of matter - the thousands tens of thousands of forms or shapes of bodies of which it is susceptible - and the harmonious arrangements of the whole - we are struck with wonder & admiration at the wisdom & perfection of that Being who created them; as moral, intelligent & dependent creatures, we ought to be penetrated with love & gratitude to Him as the moral governor of the world, as the beneficent disposer of all the blessings which we enjoy.

But, however varied, diversified, matter is, susceptible of two grand divisions, one modification being called inorganic, the other organic. The first comprises all those substances that do not contain within themselves any element of change...
- either of growth or decay - have no particular or definite shape or size; have no power of reproduction or multiplication, but are acted on entirely by external agents. Of this form of matter, are the earth, metal, air, water &c, and in fact, all bodies that do not contain life.

The organized, on the contrary, is that form of matter which always presents to the eye a definite shape, has its powers of germination, growth, vigour, age & decay; contains within itself the organs, or apparatus for its full development, definite existence & final death. This class of substances comprises all those modifications of matter that have life, either vegetable or animal.

Inorganic matter may exist in the same state for an indefinite space of time - for ages, for centuries, or perhaps the everlasting hills may exist while the world shall last - while organized matter has its bounds of existence prescribed, beyond which it cannot go. Its limits of decay & death are ascertained, as those of its growth and...
development. The former belongs to the province of Natural Philosophy and Physics, which I shall not consider. The latter to physiology and anatomy, which, so far as it is connected with the general phenomena of life and nutrition, will be the subject of the following remarks.

Animal and vegetable life bear considerable analogy. They both have their periods of infancy, adolescence, youth, virility, and decay. Trees and vegetables have definite proportions, always identical—have a covering analogous to the skin of animals—have tubes or vessels, corresponding to the blood vessels—have a fluid, similar in use to the blood, from which an essential or depositable solid part that contributes to the growth and maintenance of the tree. The leaves, like the lungs of breathing animals, are an apparatus for the secretion of the blood or sap. They have also organs for the reception of nutrition. This is procured from the earth. Here, however, the analogy fails. The tree has no stomach; but does it apparently
receive any solid food - it shrinks with life a growth for years in a flowerpot, without any diminution of the earth. The exact mode, therefore, by which it receives nourishment is not demonstrated to a certainty.

As vegetables have no digestive organs properly so called, it is supposed, with good reason, that matter is taken up by the tenuity of the roots in its elementary forms - as in that of grasses. The simple elements of vegetable matter are very few in number - carbon, hydrogen, oxygen, nitrogen; in diversified proportions, forming the principal of all the various productions of the vegetable kingdom, so that the mildest fruit or offensive fruit, of vegetables, and the deadliest vegetable poisons, are composed essentially of the same elementary substances - their offensiveness or inoffensiveness, depending upon the different proportions of the combinations. Animals, besides their digestive organs, are distinguished from vegetables by sensibility, locomotibility, or
Locomotion—The power of judging of bodies by the various senses, as feeling, seeing, etc., and the capacity of motion or moving. Under the former head, I mean to comprise, not only the senses proper, but as regards the higher order of animals, these manifestations usually denominated the faculties of the mind—and under the second, all those motive impulses required by our wants, whether mental or corporeal. These sensations and motions are the result of nervous influence, hereafter to be mentioned.

It cannot be expected that I should enter into a detail of all the phenomena of animal life in the short limits of a lecture—such detail would require volumes. I propose in this, only to give a brief description of the general form of functions of the animal organism concerned in nutrition, preparing to some subsequent remarks on alimentation &c &c.

The human body is composed of but very few simple or elementary principles—the chemist has been able to detect little else besides oxygen, hydrogen, azote & carbon. The same constituents of which vegetables are composed...
The human form, in the animal, muscle, fat, blood, lymph, gastric juice, saliva, mucus, bone, cartilage, tendon, etc., by combinations in different proportions.

The human system has been divided into solids and fluids. The proportions have been variously estimated. At from six, nine, ten parts of fluid to one of solid.

The solid parts are the bones, tendons, muscles—

The liquids, comprise the blood, lymph, mucus, and other secreted fluids; or those fluids which are separated from the blood, by the different surfaces, glands, etc. The body contains at one time, more fluids than at another—

the proportion in youth is much greater than in old age, in some states of health, than in others, etc.

The human form has suffered less change in the lapse of time, than that of most other animals. The general contour of the frame is nearly what it was when first given from the hand of the Creator. There is considerable variety, as respects size, color, expression,
of the features. — The family of Noah, the stock from which all the Nations of the Earth have sprung, were probably nearly alike. — The variety of the present human family, has probably been produced by gradual changes: The modes of living, the diet, the usages, the habits, the peculiarities of occupation, or even of thought, have probably subserved the end of producing a nationality in the appearance of different people. "Lands intersected by a narrow path" have not only their antipathies, but their peculiarities of features. The experienced eye can detect, at once, the North from the South, and even in our own country, the descendants from the Pilgrims can generally be distinguished from others of their countrymen who claim a different paternity.

The modes of dressing children by different nations have probably produced great effects in the appearance of the face and head. The infant’s head is easily moulded into any shape during the first months of its life. The bones of the Cranium are not yet united — and we often see
The effects of position in the human head, which last for life. The fact that a tribe of Indians on one continent, avail themselves of this deformity of the base of the cranium, to flatten their children's heads, is familiar to us all.

The bone of the face, or indeed of the whole body (which, however, in the last respect is slight) may have been gradually changed in the same way—peculiarity of dress, customs, etc., so that it ought not to be a subject of great surprise that we observe to great a variety in the features of different nations.

The variety of colour in the human family has been the subject of much inquiry; but I believe it has not elicited a satisfactory conclusion. Why should two members of the same human family, descending from the same stock, original stock, be of different and directly opposite colours? This effect has been attributed to climate—a northern producing the lightest, the southern a dark colour of the skin. It is certain that...
exposure to the sun in a southern latitude, has considerable
the effect on the white variety of the species; but it never
produces a black; and if the subject retain his health,
I return to a northern latitude, the light colour is restored.

And again, a northern latitude has no effect on the
black variety. — The unmixed Africans of the twentieth
generation in this climate, maintains the same colour that
his ancestors brought with him; besides the Laplanders,
the Esquimaux of the Indians of our own country, main-
tain a dark, or coffee-colour, though inhabiting a cli-
mate supposed to be favorable to the production of the
white variety only. There is something inscrutable in
this variety of colour, the reason of which we are most pro-
foundly ignorant. He who created all things, knows
best thin ways of designs — and has not yet permitted us
to look so far into the mosques of Nature, as to penetrate
all her mysteries. — One thing we know — that black peo-
ple can withstand the effects of heat much better than white,
and it is therefore a merciful provision that people inhab-
iting very warm climates are generally dark-coloured.
Some ingenious experiments, by Sir Everard Home, are
very satisfactory on this subject. By opposing the back of
both hands to the hot sun for some time, one naked and
the other covered with black, the naked hand was dis-
tressed, while the one covered with black was unaffected.
Yet, as indicated by thermometers placed on the hands,
the black was three degrees warmer than the other.

The colour of the skin depends upon a pigment, or
colouring matter, deposited from the blood, called the rub-
function, which is deposited on the outside, between
the true skin, or epidermis, or outer transparent invisible
covering of the body. In the negro, it is black, in the Euro-
pean, European-American, white, or nearly so, mixed in
other, giving the different shades observed in different people.

The frame of the human system is anatomically
called the skeleton. It is composed of bones. This is
The ground work, giving the body its position, shape and proportions.

The muscles are that particular formation of fibres known in the edible animals, as the lean of the meat. It is generally of a reddish colour, though varying in different animals. These are attached to the bones, generally arising on one and inserted into another. They are contracted by operating as pulleys to the bones; the levers of the body; they produce all the various motions of the system. Some of them, though not all, are subject to volition, on the dictation of the mind, conveyed through the influence of the nervous system. Some muscular motions are entirely dependent on the action of the mind — such as the actions of locomotion, or moving about — of pretension, as those of the arms, hands, etc. — all those motions which are subservient to our will, or inclinations. Some are of a mixed nature, such as acting without the immediate cognizance of the will, but which can be checked through its influence for a time. These are the muscles of respiration or breathing.
From an entirely independent of the will, as the action of
the heart & arteries. The respiration & the motions of
the stomach & bowels. No muscle, however, obeys its
action may be, & however independent of the will, is cap-
able of performing its office when deprived of nervous
influence. — By dividing the nerves going to the heart,
that organ ceases to beat. — By destroying the res-
piratory nerves, equally fatal results ensue, the dia-
phragm & other respiratory muscles cease to perform
their offices. — But how do muscles contract?

This is a question which has not been satisfactorily
answered. Minute examinations in anatomy have
not been able to detect the mode. That they contract
or shorten by some organization of their fibers is certain.
When a limb is bent, the muscles on that side in
shortened become thicker in their middle portions.
They were contract for some time after an animal
has been dead; that is, in the ordinary reception
of the torus donut, but of the animal has ceased to breathe, the contraction of muscular fibres will be found to take place.

As a familiar example of this fact, I refer you to the case of a recently slaughtered beef or other animal. The heart has been called the engine of the animal life in some, contractility in others—some fanciful hypothesis of the phenomenon of animal life have been attempted to be built upon this principle.

The trunk of the body is divided into three great pleuric cavities, as they are called, or cavities which contain what we call organs or apparatuses.

These are contrivances which confer either directly or indirectly to nutrition, or to the growth and mainenance of integrity of the organs, as well as of the moral and mental manifestations. These are the head, thorax, abdomen. The head comprises the face which contains four of the organs of the senses, those of sight, hearing, smell, taste. The cranium or skull...
Contains the brain, the fountain of all the senses and the most elevated part of the nervous system.

The thorax, chest or breast, contains the lungs which are the organs of respiration, the heart, the center of the circulatory system connected with the arteries which carry the blood from the heart to the veins, which return the blood to it, and the lymphatics, a portion of the vessels indirectly connected with the veins. These last take up the useless blood and parts from different portions of the body to carry them to the veins, where they mix with the returning blood, just before it reaches the heart.

These two systems of vessels, which produce nutrition, as distinguished from digestion. While one set of arteries are constantly depositing the solids, fluids, secretions of the system, the veins are returning the dephlegmated blood.
of the sympathetics the useless devourous substances either to be removed by evaporation through the lungs for further use of the system, or to be thrown out by perspiration or otherwise.

I shall confine myself principally to the consideration of the circulation of the system, in its connexion with nutrition, with some remarks on the influence of the nervous system.

The organs within the cavity of the abdomen will engage attention at some subsequent time.

The circulating fluids are the principle of the metabolic, the chief agents which are effecting the changes that are undergoing in the tissues of the animal organism. They contribute the growth, maintain the integrity, and carry off the wasted useless matter that encounters the system. A general description of the structures and functions of each will be made, tending to a proper understanding of them.
The fluid called the blood, its revolutions in its vessels, will first engage our attention.

The quantity of blood in the human subject has been variously estimated. It does not come within the limits heretofore prescribed to enter into a detail of all the opinions of authors on this or any other subject. When a fact is stated, it may be understood as giving the opinion of the last entitled to belief, or to the majority of evidence. The most correct view of the quantity of blood is 20 or 30 pounds, or in the proportion of about one-fifth of the weight of the whole body.

The blood is in constant motion. It is sent from the center or heart, to the circumference, by means of the arteries; returns to the center by the veins. It is therefore con-
Stanly moving in a circle and consequently it noted
an called the circulation. But it has two
circulations - one which carries the venous blood
or the blood which has already passed the general-
circulation and been used in the nourishment and
repairs of the system, directly to the lungs, to be
changed or renewed, by means of blood back to the heart
together with the other, the general circulation.

The heart is the main agent in all
the actions. It is situated in the centre of the
chest, between the right and left lungs, near
the root of the aorta, ascending and extending
into the left cavity, resting partly on the dia-
phragm, a midriff, the muscular membrane
partition between the chest and abdomen or bowels.

It is separated from the lungs by being placed
between the doubling of the pleura or lining
membrane of the chest, which comes on and
forms a division between the lungs. This mem-

brane is known anatomically as the mediasti-

num. Besides this, the heart has another
membrane covering the pericardium, or
heart case. The effusion of fluid is supposed to
be to prevent too great distention of the heart,
and also, to contain a liquid to facilitate the
motions of the organ. It is to

prevent friction; this provision to facilitate
motion, is not peculiar to the heart alone,

the jointed articular parts of the body that are
subject to friction are provided with a glutinous
deposition to facilitate their motions.

The heart is a strong muscular body.

Some parts, however, are thicker than others.

The arteries are thinner elsewhere than the ven-

ous, for a very obvious reason——they receive the

blood at arms by a very forcible contraction, pass
it through the valves into the ventricles - while the ventricles send it through their respective systems, or at least, give it a powerful impulse at the commencement. The heart has two ventricles, the auricles are the superior, & the ventricles the inferior part of the heart. It is double, or perhaps, to strict
strictly correct, with, as well as the warm blooded animals, has two hearts - a right, or pulmonary, or
that heart which receives the blood from the veins and carries it to the lungs - and the left, or aortic heart
or that which sends the whole column of blood into
the large vessels. or rather, the commencement of
the great circulatory system.

Though the heart is apparently single - is
enclosed in one membrane, & to all outward appearances, is one organ, yet, it is in fact 2 in office;
true distinct organs - has no direct communication after birth, between the right & left side.
is divided through its whole extent by a system of muscular or mucous and membranous expansion.

From the fact that the blood flows in a circle, it is obviously difficult to say where the commencement is. We will, however, commence at the right auricle - the blood of the whole system is conveyed to the right auricle; it is then divided into the afferent and efferent channels. These are large trunks in which are collected all the venous blood of the system from all parts of the body. The blood is a dark, almost black, having mixed with its fluid; colour in performing the various functions of the heart and conducted to it in its passage through every part of the animal's body.

The right auricle is a dilated cavity formed by a lateral enlargement of the two cavities of the right auricle is another cavity connected with
auricle by means of a foramen or hole. This foramen is shut by a valve, which triangular membranous masses drawn across the ventricular portion of the hole. While the auricle is filling from the blood received through the cavae, the ventricle is empty or equivalent with its muscles, which are very strongly fixed. As soon as the auricle becomes filled by the stimulus of the blood, or some other cause (perhaps the stimulus of distension) produces a contraction of its muscular fibres. The resistance of the column of blood, from above below, as well as a partial obliteration formation of the coats of the lower cavae which it is not necessary to particularize, prevents the auricle from being emptied in either of these directions. The blood is consequently forced upon the valve, which opens into the ventricle; it is admitted into that cavity. The stimulus of the blood now excites the ventricle—this contracts powerfully,
The blood is compressed, that is, the valves which open from the auricle of the blood vessels with great force into the pulmonary artery, which carries it to the lungs. After minutely ramifying through the lungs being exposed to every small air cell in the aircell, its colour becomes changed from a dark purple or black to a bright scarlet, when it is again collected into the pulmonary veins, reaches the left side of the heart, or, rather, the left heart, generally by four vessels, enters the left auricle to commence another course.

The object of the pulmonary circulation is, no doubt, to effect an important change in the blood. When sent into the lungs it has lost its high arterial color, has parted with some portions of the solid and fluid parts of the system, has become unfit for the purposes of nutrition. In addition to this, it has one or few nutritive principle of food, the lymph, or the colorless solids diffused in the system of the former
to be converted into blood, the latter to be regenerated by the action of the air in the lungs. In its passage through this viscus, it is exposed in small and minute vessels, and through these coats, to the air in the acts of respiration, and is changed from a dark to a bright red colour. How this change is effected, has been a subject of some dispute among physiologists. I shall not enter into the discussion; one thing is certain—the presence of oxygen is absolutely necessary. Experiments have been made with various other gases. The result has always been fatal to life. Nitrogen, Hydrogen, though they possess no direct deleterious effect, yet they will not support life. The colour of the blood is not affected when these are breathed; death supervenes from the want of the proper stimulant, Oxygen. It is from this demonstrated from these and other facts, that oxygen is absolutely necessary to animal existence. Indeed no thing, either animal or vegetable can long exist without
this satisfying principle.

The blood, after receiving the nutritive principle of aliment, by the great trunk of the absorbent, which is entered with the lymph, into the large veins, just before they reach the heart, and after having undergone the process of aeration, or oxygenation in the lungs, is fitted for the various offices, which it is called upon to fulfill, the principal of which is nutrition, or operating those changes which are constantly being effected in the several tissues of the whole organic system.

The left side of the heart is constituted essentially like the right. The blood is supplied into the left auricle from the pulmonary veins. The auricle contracts, sends it into the left ventricle, when this contracts, throws the blood into the aorta, or great trunk of the arterial system. This soon divides and subdivides into innumerable vessels, which go to all parts of the body. The number of arteries of other
Bloodvessels are enormous, commencing with a trunk as large as the thumb, tending with minute vessels almost imperceptible to the view: they in fact pervade the whole body. A slight puncture with the finest needle, in any part of the body, will wound some of these vessels, as indicated by a discharge of blood.

When we add to this, the fact, that there are thousands of thousands of vessels which an tooth will to admit the red globules of blood, only the second portions; the vascularity of the system will appear, as it really is, astonishing; the attenuated extremities of the arterial system is what is called by anatomists, the capillary system, and is that system which performs nearly all the operations of nutrition. It is in these extremely minute vessels that the whole process of the deposition of matter is performed; these vessels deposit bone, when bone is required; fat, muscles, tendon, &c., when these are wanted— all the solid parts of the body, as well as the fluids...
gastro-jejunum, mucous salivary, the perishable fluid is.

The solid part, or deposit, by the direct action of
the capillary vessels. The fluids are generally secrations
from glandular bodies. These glandular structures
are the intermediate agents of the capillaries.

Some of the organs which secrete fluids can be seen,
but here the ultimate action of the capillaries is as
much beyond our ken as it is in those that deposit
the more solid parts of the body. We are certified of
the fact that the solids of other parts of the system are
separated from the blood; that it is from this deposition
that the growth of the body is produced, its size main-
tained. But the machine is too minute for us to
examine. Besides, the sanguinous system—the blood
vessels—than any other vessels that are subservient
to the process of nutrition. These are the general
absorbers, or the lymphatic system, as distinguished
from lateral absorbers, hereafter to be more particular.
noticed. They commence at the circumference and terminate in the center. Their office is to take up the useless or non-essential parts of the body by a process which is called absorption. When we say this, we say all we know on the subject; this mode of action cannot be seen. However, the certainty of the effect is not, therefore, at all invalidated by our ignorance of the exact mode of operation.

But it may be asked, how can a vessel that is so very minute that it cannot be detected take up solid bone? We can only judge comparatively by the size of bodies. Matter is subject to division to an extent to which we cannot judge by any of our senses, or perhaps, comprehend by any operation of the mind. It is probable, however, that solid bone is not taken up by the absorbing, but that these vessels, by some mode inapprehensible to us, alter its chemical and physical properties, by a species of elaboration, from it into a fluid called lymph.
would be no bounds to the growth of the system. There is, through the whole of life, a constant action of deposition & absorption, composition & decomposition. Upon these are fed an action of both of these systems in vegetative elements (lymphatics) depend, in a great measure, a healthy state of the body. If the deposition be disproportionate to the absorption, obesity, perhaps death, will ensue. If they are in a reverse ratio, emaciation or marasmus will take place. In youth the former predominates; in adult age, an equilibrium is maintained, as well as in a healthy old age.

The lymphatic vessels, like the veins, gradually become less & less in number as they approach the center, until they empty into the veins near the heart, in two trunks. Thus the animal system is constantly undergoing changes. Some part of the machinery becomes worn out—carried away in the
absorbed and rejected by some of the outlets, while they are replenished by new and fresh depositions. It has been calculated that the whole machine of man undergoes a complete change in a few years. Some have estimated that every seven years a complete physical revolution in the human system that every part of the human frame is carried away and replaced in that time.

Without contesting the correctness of the precise time that it takes for these revolutions, yet these general facts have been demonstrated by kindness of experimenting as it is now a part of the known and certain truths of the science of physiology.

The blood sent from the right side of the heart, after having performed all its functional duties of deposit and secretion, is again taken up by the veins in small vessels or capillaries, which are probably nearly as numerous as the capillary arteries. These by most physiologists, are supposed to be continuous with the minute
minute arteries that convey red blood. The veins converge towards the contracted from being small in size and numerous, become gradually larger in lesser number, until finally empty themselves by two large trunks, into the right auricle of the heart.

From having parted with a large portion of its substance, by means of its deposits and secretions, the blood in the veins, which reaches the heart, would, in much reduced in quantity, were it not for provision to supply this deficiency. A little before it reaches the heart, it receives, by means of the trunks of the lymphatic vessels, not only the lymph, but the chyle, the nutrient principle of food. The duct of the chyliferous system, uniting with the lymphatic ducts, both being united together into the veins. In addition to this, the veins absorb watery dotted fluids from the stomach, uterine, pericardial cavities. Innumerable experiments have proved that the
Veins, in addition to their office of returning the blood to the heart, are absorbents in a certain sense. I. E. that certain fatty fluids are received into the blood by imbition through the coats of the veins. It is in this manner, that liquid, water, and other substances, immediately introduced into the circulatory system, when drunk. This accounts, in part, for the sudden rapid effects of stimulants on the general system.

Having briefly noticed the principal organs incirculating and nourishing life. I am now to examine into those operative forces, which in connexion with those organs of functions already described, give an impulse to all the necessary actions. So far the animal system has appeared, as it certainly is, a curious and wonderful piece of mechanism, but without some other power within, inherent in itself, or applied externally it must remain inactive. It is evident that a watch or steam engine, or a hydraulic machine, with out
In fact in motion, simply by the ingenuity of
perfections of its machinery. The springs, the
steam, or the water is absolutely necessary for
its motions. In looking at the human mach
ine, we not only comprehend the intricate and
beautiful machinery; but we also see the pow,
that operates all its motions—this power (sub
servient of course to the great First Cause of
all things) is afforded by the brain and nerves.
only what is called the nervous system.

The brain is that large mass of
medullary, or fatty matter, which fills the
cranium, or skull. It is divided into two
portions—the upper or anterior portion, which
is greatly the largest—is called the cerebrum.
the posterior and inferior which is small, is
called the cerebellum, or little brain.

These are separated on the outer part,
by a strong septum or partition; but united and connected below. The cerebrum of the cerebellum unite and form what is called the medulla oblongata, this being the base of the brain. From this proceeds most of the sense of the head, face, and of the senses. The medulla oblongata becomes smaller, passed through a foramen or hole in the base of the skull, descends into the spine of the neck, and from thence through the whole length of the back bone. Through the whole course of the prolongations of the two parts of the brain are kept separate, the cerebrum occupying the anterior or fore part, of the cerebellum the posterior or back partition. From the brain to spinal marrow proceed the system called nerves. The nerves are white cords, deriving
Their origin is from the brain proper, or the spinal marrow. The nerves are composed of the same substance as the brain itself, but they are covered with strong membranes or coats, called their neurilema. They are large where they originate, but divide and subdivide in their course, until their extremities become too small to be seen. They were at one time supposed to be tubular, to contain within them a very subtle fluid, called the nervous fluid. At this tubular structure has not been discovered, as no fluid has ever been detected. This hypothesis has, pretty much abandoned, the function of the nerves, is that of sensation, or of communicating to the senses, or the brain, the common center of the nervous system. These impressions which we call sensations, and also of cutting...
into action those motions which are dictated by the mind.

The large brain, or cerebrum, is supposed to be the organ of the intellectual faculties, or mental manifestations, while the cerebellum is that of the moral manifestations. From the former proceed the nerves which govern the power of locomotion, perspiration, and all those acts which proceed from sensation, either physical or intellectual, as well as the senses proper—from the latter, sensibility, or the impression of given to the mind of pain, pleasure, or knowledge of our wants, desires to be done. As an example of this, let us take the sensation of hunger. When food is put in the stomach, the nerves of sensation convey the impression to the brain.
The brain perceives the impression through the motor nerves, commands the organs of precaution, as they have been called, as the hand. It must be to supply the want. These comprise the simple operations of the mind. The nerves of motion and sensation are, however, united in their course generally in the same sheath, crossing so little that there is no part of the system that is not intimately supplied with both kinds. They are, however, distinct in their origin, & separated in their offices. Their facts or recent development for them you are indebted to that veteran physician, Sir Charles Bell, who, for nearly half a century, has been a conspicuous contributor to science. He ascertained that sensation by dividing the posterior root of the spinal
serves, that sensibility was entirely destroyed in
the parts to which they were distributed, while
the power of motion was preserved. By dividing
the anterior roots in other animals, sensibility
was retained, but the power of motion lost.

Besides the general nerves already mention
ed, there is a great system, called the sympathetic
intercostal or splanchnic. These are situated
within the abdomen—two principal lying on
each side of the vertebral, or back bone, with
frequent unions, by which are united ganglions.
They are connected with the vertebral nerves
by trunks from which, & with slight connections
with some of the nerves of the head. They
give out branches to the viscera of the chest &
abdomen, or to the parts contained within other
cavities, as well as those having connections with
their functions—to the respiratory muscles, heart,
and of the stomach, intestines, &c., within the cavity of the abdomen. They are, undoubtedly, the source of those obscure motions, which are called involuntary, of which I have been before referred to.

That the brain alone, or, some how, the organs of the mind, appears to be evident. But how a certain combination and arrangement of matter should produce all the higher operations of the intellect is what store-house should be laid up all that train of events and circumstances which have occurred for years, with their dates or comparative nearness to the present time—how transactions which have never been presented to our outward senses should be perceived by the brain and mind—how the brain should pursue a train of reasoning.
Induction — though the science received by have engaged the attention of metaphysicists and physiologists for centuries — yet the many venture to say that the facts are not as to any useful discovery made, so totally involved in obscurity as they ever were. And although physiology may, in the pride of that intellect, the operations of which they cannot comprehend, propose to defend their favorite hypothesis, yet it better becomes us to acknowledge our ignorance of that which it is not important for us to know, and to submit to the bounds prescribed by him who best knows our true interests. Of the particular opinions advanced by the various metaphysicians on the operations of the mind, it is a sufficient refutation of them all, that they are perfectly contradictory of the different opinions of the mode in which the sensation of the sense impulses
are conducted by the nerves; no hypothesis seems as well grounded as that which supposes it to be analogous to electricity or galvanism. But when we admit this, we are as much in the dark as we were before—the electric or galvanic influence is as little understood as the nerves. Some ingenious experiments have been tried to prove its identity.

When a nerve, going to a particular organ, has been divided, the function of that organ has been destroyed. By connecting the two portions of the nerve by means of a galvanic circle, the function has been restored. Thus indicating that the nervous principle has been conducted by means of galvanic influence. Even in the recently dead body, the effects of galvanicism are wonderful. When applied to the nerves of the foot,
most violent contractions of the muscles. Some interesting cases of that kind, are detailed by Dr. Cline, & may be found in Dunglison's physiology, Vol. 2, page 315 & 316—Strong & laborious breathing were induced on one subject, and on another, violent contractions of muscles of the side, &go down muscles of the face. In one case "rage, horror, despair, anguish & ghastly smile, united their hideous expressions in the features, & the end of the spectators were forced to leave the room, & others—faint'd."

Having examined those organs, sensations which, unite, form the animal organism begin to it sensation & motion, I shall inquire very briefly, what life is, or rather, in what part of the organism does it exist?

To say that it is the result of organization, or the effect of a certain arrangement
Another does ask: give a satisfactory explanation, for the circumstances frequently exist, without and without the presence of life; as for instance, in the recently dead body. It is the declaration of the Scriptures, and the olderPhysiologists, that the life of the animal is in the blood. The Jews were required to offer blood as a sacrifice, to abstain from eating it. Under the Institutions of the Jewish Church, the life of the animal was taken away by bleeding it to death, and this life, which existed in the blood, was offered as a sacrifice for them done instead of them own, which they had forfeited by their transgressions.

It will be recollected, however, that the doctrines of the life of the blood was only incidentally referred to by the Divine Lawgiver.
with the view of inculcating the necessity of abstaining from its use, as an article of diet.

The great truth that "without the shedding of blood there is no remission of sin" was the one strongly enforced. But I am perfectly willing to take this, as well as every other declaration of Scripture, in its broadest sense, to say that the life of the animal does exist in the blood of that without it life could not be sustained.

I contend, however, that it is not the whole cause of vitality—else, I should deny the divine agency of the maker, himself, for it is by him that every moment of our being is sustained.

It is certain, that a large abstraction of blood will destroy life—do with the abstraction of caloric, oxygen, or nervous influence.

If vitality exists alone in the blood, it strikes me as being necessary for the advocates of
this doctrine, that they prove life to exist
under every circumstance when the blood
is detained in the system. This they cannot
do, for such is not the fact—death more
frequently occurs from other causes than
from the loss of blood. This is too evident
to require argument. We are daily
surrounded by proof. Besides, death
frequently takes place from too much blood
from plagues, apoplexy, &c. Here, accor-
ding to this theory, death is produced by
too much life. How common is it that
the whole phenomena of life are elevated
by the loss of a quantity of blood, and an
urge thus be told that the abstraction of life
from the system is to promote the life of
the system. Blood, in itself alone, is in-
capable of preserving its own life. It
depends upon other influence to preserve its
fluid state—probably the nervous. Added
edema impression upon the nerves of the sys-
tem will destroy life more quickly than the
most rapid abstraction of blood, even when
not a particle of that is lost. The division
of the spinal marrow, that great prolonga-
tion of the brain in the neck, will produce
instantaneous death. The truth is the nerves
of the blood vessels mutually sustain each
other. Without the nervous system, the heart
could not make a single pulsation; without
the circulation of the blood, the nervous in-
fluence could not exist.

But she will not pursue this subject
any farther at present; but say, in conclusion,
that I am willing to take the word of God
of him, who can neither lie nor err, and
Who has declared that he "breathed into
man the breath of life" — it is on him we
live, it moves the soul being that body
is a machine, susceptible of a variety of
motions & actions, and endowed with power
from on high to perform these motions and
actions. The difficulty in accounting
for the higher operations of the intellect
as distinguished from the mere animal
instinct, induces me, in addition to the
more certain aids of the Scriptures,
to conclude that man is a combination
of matter & mind, or, if you please,
of body & spirit.